# State Source Water Protection Report

## April 2013

***The information compiled in this report is the result of a collaboration among EPA's Office of Ground Water and Drinking Water, EPA Regions, the Association of State Drinking Water Administrators, and state drinking water programs.***

## Table of Contents:

## Introduction to 2013 State Source Water Protection Report

### *Purpose and Content of this Report:*

This 2013 State Source Water Protection (SWP) Report was developed as an information-sharing tool among states, with assistance from EPA Regions in consultation with their state drinking water programs, the Association of State Drinking Water Administrators (ASDWA) and EPA's Office of Ground Water and Drinking Water. ASDWA and others have developed several documents describing state source water protection activities,[1] but this Report is the first comprehensive collection of program descriptions from all fifty states. This Report was developed to serve as a tool for a variety of audiences and purposes: for state drinking water programs, as a means to share innovative and effective approaches to protecting sources of drinking water; and for EPA, to help the Agency improve its understanding of state SWP programs and help support state and local SWP program implementation.

The Report includes the following elements:

1) **Introduction**
2) **Catalog of Case Examples:** examples of source water protection efforts from the state profiles, organized using the categories from "ASDWA's Elements of an Effective State Source Water Protection Program" (see footnote 1).
3) **Individual State Profiles:** highlights of SWP program accomplishments; data collection and integration with other programs; and efforts to develop and leverage resources.

The information presented in this Report documents important progress and accomplishments made despite limited resources. Further, it demonstrates the benefits of cross-program coordination, use of authorities, and the importance of developing and sustaining effective partnerships. The challenges are wide-ranging and often require locally developed strategies which are uniquely designed to address a variety of contaminants and sources. It is notable that every state has invested in source water protection and is measuring progress. State levels of investment vary widely and encompass a diverse set of activities. While progress has been made from a national perspective, clearly there is much work yet to be done, for example, to address nonpoint sources of pollution and stormwater impacts on sources of drinking water. The work of states and their partners in this Report presents an important opportunity to build on those efforts. The national Source Water Collaborative (www.sourcewatercollaborative.org), state collaboratives, and regional or local partnerships also offer opportunities to focus on priority contaminants and source water areas to further our progress. The Report also contains a catalog of the case examples found in the state profiles to allow readers to quickly view state and local source water protection work that might be of particular interest.

[1] Elements of an Effective State Source Water Protection Program: http://www.asdwa.org/_data/n_0001/resources/live/effective%20elements%206-2008%20-%20FINAL.pdf; Information on Source Water Protection to Assist State Drinking Water Programs: http://www.asdwa.org/_data/n_0001/resources/live/ASDWASWReportFinal21.pdf; Source Water Stewardship Guide to Protecting and Restoring Your Drinking Water: cleanwateraction.org/publication/source-water-stewardship-guide-protecting-and-restoring-your-drinking-water

## *Background*

**Statutory Requirements:** Under the 1986 amendments to the Safe Drinking Water Act (SDWA), states developed wellhead protection programs that provide a structure for water systems using groundwater to protect their drinking water sources from contamination. In the 1996 amendments to the SDWA, the scope of source water protection was expanded to include *surface water* sources in the development of state Source Water Assessment Programs (SWAP). The SDWA amendments directed states to undertake assessments of each federally regulated public water system. Each assessment contained four tasks:

1) Delineate source water protection area(s) for each source (well, surface water intake, and some springs);
2) Inventory each source water protection area for potential contaminant sources;
3) Conduct a susceptibility assessment for each drinking water source; and
4) Make the findings of 1-3 available to the public.

**State Assessments:** States have fulfilled the SWAP requirements mandated by the 1996 amendments. The process states undertook to delineate the source waters areas, inventory potential sources of contamination, and determine source susceptibility (and the data and information gathered through that process) has proven to be invaluable for states, water systems, and other stakeholders as they develop and implement source water protection strategies to address potential contamination. State assessments typically identified the most threatening contaminants to ground and surface waters and the most prevalent sources of contamination. Some of these sources included agriculture, commercial and industrial, wastewater, transportation, and residential sources. The variety of contaminants and sources show that source water protection programs and strategies need to consist of multiple efforts and activities, in coordination with a variety of entities using targeted approaches, to reduce the risk from priority local and regional threats to drinking water.

**Moving from Assessment to Protection Despite Program Constraints**: No regulatory mechanisms exist to compel water systems to use the building blocks of the source water assessment to implement a source water protection plan. Nonetheless, source water protection plans are required of water systems in several states and many states work collaboratively with water systems to support voluntary actions on the part of these systems to develop local plans. State SWP program funding and staffing varies considerably among states. The initial SWAPs were supported with dedicated funding from the Drinking Water State Revolving Fund (DWSRF) set-asides and many states continue to use other set-asides to implement SWP activities with dedicated state source water program staff and funding. Other states face political barriers and other obstacles preventing them from fully utilizing these DWSRF set-aside funds (e.g., “competition” between funds for infrastructure and state use of set-asides). Several states have been able to effectively coordinate with Clean Water Act and the United States Department of Agriculture (USDA) conservation programs and leverage both funding and activities under those programs.

Many states have updated the assessments and worked collaboratively with other state, federal, and local partners to protect sources of drinking water, based on the information provided from the assessments. This has been the case even though states are not required or provided dedicated funding to update the SWAP assessments (or to develop them for water systems constructed after the initial round of assessments was completed).

**Characterizing State Source Water Protection Programs**: The 1996 SDWA amendments provided a good deal of flexibility for how states were to develop their SWAP programs. There are a variety of source water assessments and implementation approaches in each of the 50 states and territories – tailored to each state or territory's unique circumstances. This variety is reflected in the state-by-state summaries in this Report. State SWP programs vary, depending upon a number of factors, including where the state drinking water program is "housed" (i.e., environmental agency or public health agency); available program resources; the particular legislative and regulatory construct for that state program; and the nature of the source water challenges in a particular state (i.e., most prevalent sources and most threatening contaminants). Despite these differences, state SWP programs tend to have some of the following common elements:[2]

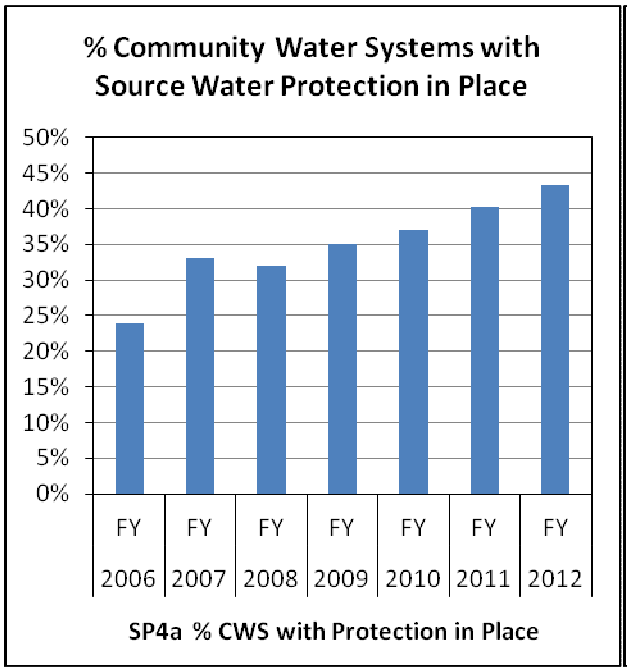
1) Program elements to measure and characterize the nature of threats to sources of drinking water and to track program effectiveness;
2) Overarching state source water protection program implementation strategies;
3) Efforts to sustain partnerships, integrate available information, and leverage federal, other state, and local program authorities and resources;
4) Approaches to motivating and catalyzing local source water protection program activities;
5) Approaches for managing and sharing source water data and information; and
6) State statutes and regulations.

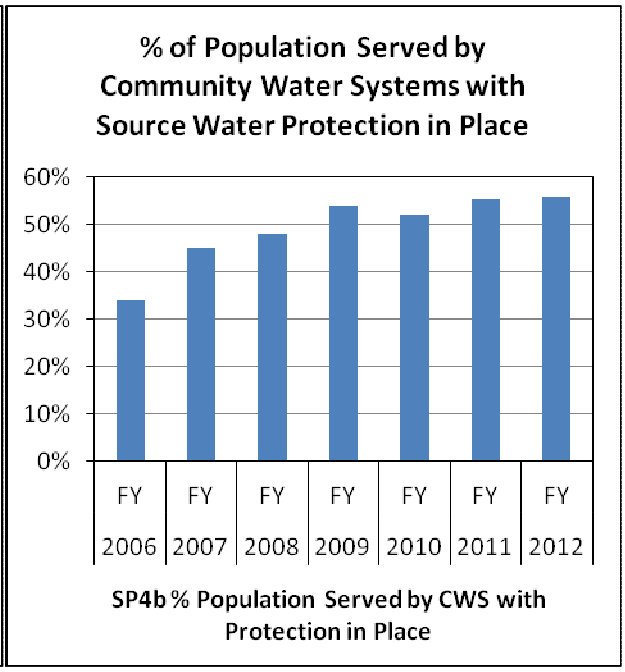
**Partnering and Sharing Data to Promote Local Land Use Management and Planning:** Developing partnerships and sharing data with other programs is critical to the success of SWP efforts across the nation. In particular, source water protection can be effective when sound land use management and planning approaches are applied to minimize risks to water quality and quantity from existing land uses and future development. Neither state drinking water programs nor public water systems are authorized under the SDWA to plan and manage land use (other than to purchase land for conservation). This disparity between authority and responsibility means that both state agencies and water systems must work collaboratively with state land use agencies, local governments, and landowners to encourage land use and stewardship decisions in consideration of local water quality concerns and local laws and practices -- often involving multiple local government entities with divergent laws and practices for their respective watersheds or ground water protection areas. To help support these efforts, many states developed source water assessment maps in a Geographic Information System (GIS) database format as part of their SWAP, and some are now overlaying these GIS maps with other state, federal, and local entity maps to target funding and resources for projects and regulatory activities. Although this can be a resource intensive undertaking, it has provided a strong foundation to coordinate efforts and promote land use planning and stewardship across local jurisdictions that considers protecting source waters.

[2] Elements of an Effective State Source Water Protection Program: http://www.asdwa.org/_data/n_0001/resources/live/effective%20elements%206-2008%20-%20FINAL.pdf;

**Reporting on Progress:** EPA has a flexible approach that allows states to set their own state-specific definitions of substantial implementation of source water protection, and allows states to set appropriate targets to reflect progress made in implementing their state-specific approach to source water protection. States may adjust these targets based on changing circumstances. EPA's Strategic Plan (http://water.epa.gov/aboutow/goals_objectives/goals.cfm) addresses protecting drinking water sources. The Protecting America's Waters Goal of the *Strategic Plan* is to ***Protect and restore our waters to ensure that drinking water is safe, and that aquatic ecosystems sustain fish, plants, and wildlife, and economic, recreational, and subsistence activities.*** The 2013 National Program Goal for safe drinking water is for 50% of Community Water Systems and 57% of the population served by Community Water Systems, to have the risk to public health minimized through source water protection.

The following graphs show results for EPA's National Program Guidance (NPG) Measures:




Source: USEPA Office of Water. National Water Program Guidance Fiscal Year 2007 – 2013, Final Performance Measures and Commitments Appendix. http://water.epa.gov/resource_performance/planning/.

## Catalog of Case Examples

The purpose of the Catalog of Case Examples is to quickly view state and local source water protection work that might be of particular interest. The Catalog categorizes the state examples found in this Report into six Activity Areas. The six Activity Areas are based on a report by the Association of State Drinking Water Administrators (ASDWA) and the Ground Water Protection Council (GWPC), "Elements of an Effective State Source Water Protection Program," (found here) and they provide a framework for understanding state source water protection activities. A description of each Activity Area precedes the case examples in each Activity Area. Where appropriate we have added subcategories to further assist in identifying useful information.

State source water protection program case examples in the Catalog may contain elements of more than one Activity Area, but are grouped by the Activity Area that most appropriately applies. State examples that include more than one element are noted in each of those other activity areas and subcategories to provide a more illustrative picture of state activity in each area. These notations are found at the end of each category section. Also, a number of states have more than one case example.

The Catalog does not fully represent the wide variety of ongoing source water protection activities, but rather it provides a snapshot of the types of work being conducted throughout the states to support source water protection. The six Activity Areas and subcategories are listed in the following Table of Contents. The Table of Contents only shows the primary Activity Area in which each state case example is categorized.

## 1. Measurement and Characterization

Measurement and characterization of source water protection activities can provide essential data and information needed to inform state decision makers about where to target new activities and how to refine ongoing activities. Measurement and characterization activities link to activities within all of the other categories of a state source water protection program, and can play a key role in developing and sustaining partnerships. Measurement and characterization elements can include keeping assessment information current, evaluating program effectiveness, tracking local source water protection efforts from the state level, and tracking statewide or regional source water protection efforts.

### *Targeted Source Water Protection*

**Mississippi**

**Coordination between the Source Water Protection and Underground Storage Tank Programs:**

One of the most significant achievements realized by the Mississippi Department of Environmental Quality (MDEQ's) Source Water Protection Program is the coordination of efforts with the Underground Storage Tank (UST) Program, resulting in the enhanced protection of the 253 unconfined Public Water Supply (PWS) wells operating in the state. The location of existing storage tanks within PWS delineated protection areas is tracked using the MDEQ geographic information system (GIS). This information is then used to guide compliance efforts or direct proper regulatory response for existing USTs. It also is used to identify new sites that require the installation of double walled USTs. Also, MDEQ and the Health Department are coordinating efforts to plug abandoned water supply wells near operating wells using the Drinking Water State Revolving Fund.

**Tennessee**

**Identification of Potential Contaminant Sources in Targeted Protection Areas:**

Disinfection Byproducts (DBP) and high Total Organic Content (TOC) are buzz words in the drinking water industry. The Ground Water Management Section (GWMS) has looked at the data from all the drinking water systems using surface water in Tennessee and has compiled a list of drinking water systems and their source water protection areas based on the highest DBP and TOC numbers. The GWMS has contracted with the State's Division of Geology (DG), to conduct an on the ground survey of the top ten source water protection areas looking specifically for illegal discharges (straight pipes), failing septic systems, and illegal systems. The overarching plan is that if DG can locate and remove these potential sources, then the drinking water systems through their normal data collection should be able to show a reduction in DBP and TOC.

**Vermont**

**Brandon, VT Community Water System Receives Class II Groundwater Designation:**

Brandon Fire District #1 submitted the state's first petition for a Class II Groundwater reclassification for consideration to the Vermont Agency of Natural Resources (ANR). In December 2011, this Vermont community water system received the Class II Groundwater designation. Class II groundwater applies to groundwater that has been determined by the ANR Secretary to have uniformly excellent character; exposure to activities which may pose a risk to it use as a public water supply; and is in use, or is determined to have a high probability for use, as a public water supply source. After pursuing this reclassification for many years as an existing public community water supply, the Fire District now can provide an enhanced degree of groundwater protection to municipal system customers. Assistance from the Vermont Rural Water Association was essential in the petition process, including land use assessment, hydrogeological mapping, and development of the petition's text and maps. It is Brandon Fire District #1's further goal that Brandon can serve as an example in motivating other municipalities to establish Class II Groundwater areas for their existing public community water supplies and for groundwater areas that have a high probability for use as a public water supply, but are not yet developed.

**Additional Targeted Source Water Protection Case Examples: Navajo Nation, Arkansas, Utah.**

## *Additional Measurement and Characterization Case Examples*

**Arizona**

**GUDI mapping and investigation project along Oak Creek:**

GUDI stands for Groundwater Under the Direct Influence of surface water. Groundwater sources may be *suspect* GUDI if the well is less than 500 feet from surface water. To investigate well distances to surface water, detailed maps were created for twenty-nine (29) public water systems along Oak Creek showing a 500 foot buffer zone around each well. Two larger maps were also created to show the full extent of Oak Creek and the public water systems nearby. Oak Creek stretches 35 miles starting north of Sedona and winds its way south to the Verde River. Sections of Oak Creek have exceeded water quality standards for E. coli.

**Georgia**

**City of Colquitt – Identifying the Wellhead Protection Area:**

The city of Colquitt is located in the Dougherty Plain of southwest Georgia. The Dougherty Plain is a northeast-southwest oriented, flat plain bound on the northeast by the Fall Line Hills and to the southwest by the Tifton Uplands. Surface soils are sand to clay in composition, ranging from well-drained to poorly-drained. This soil is composed of a mixture of residuum from dissolution of limestone and imported fine sands through fluvial transport. Few surface water streams dissect the area, since there is little run off due to low-grade porous sands. The residuum in the Colquitt area varies in thickness between 50-75 feet and overlies the Ocala limestone. The Ocala limestone is characterized by having a primary and relatively high secondary porosity. Solution channels are common as well as collapse of these structures, resulting in the large number of sinkholes that occur in the vicinity. Large yielding wells can be found signifying the relative abundance and rapid flow characteristics of this aquifer.

The management zone relies more heavily on fractures traces and soil draining properties than calculated data. Since the aquifer is highly transmissive and highly heterogeneous, numerical calculations may greatly underestimate flow velocity and direction. The outer-management zone is therefore much wider and extends further up-gradient than calculated. The down-gradient extent includes surface water divides in the city to the southwest. To the northwest and southeast, fracture traces are included that may direct flow toward the well. To the northeast and east, the up-gradient extent goes to areas that have mappable fracture traces and well draining soils. In addition to an outer-management zone, an additional zone of protection is needed in the Colquitt area. A number of private wells are located within the outer-management zone that potentially allows direct and rapid connection to the aquifer. These areas and their respective drainage basins are included in a "zone of high vulnerability."

**Massachusetts**

**Updating SWAP Potential Sources of Contamination:**

In 2010, Drinking Water Program (DWP) introduced an electronic Annual Statistical Report (eASR) that replaced paper reporting. Electronic reporting saves staff time, paper, mailing costs, and other resources for both public water suppliers and Massachusetts Department of Environmental Protection (MassDEP). The new eASR allows public water suppliers the opportunity to update information on the potential sources of contamination that were identified in their water supply protection areas during the SWAP Program. The updated SWAP information is then migrated to DWP's database. DWP is in the process of reviewing the extent of water supplier participation in the voluntary update of their SWAP information.

**Montana**

**New PWS Source Review:**

One of the highlights of Montana's Source Water Protection Program is protection of public health by preventing contamination of proposed new drinking water sources. The program reviews the location of all new proposed public drinking water sources to ensure they will not have high susceptibility to significant potential contaminant sources. In 2012, this amounted to about 38 new drinking water source reviews.

**Oregon**

**Collecting Ambient WQ Data above Drinking Water Intakes:**

Due to resource constraints, there is generally a lack of ambient water quality data above drinking water intakes. Using SDWA funds (to provide technical assistance to public water systems), DEQ drinking water and laboratory staff collected samples above drinking water intakes and at wells for 48 public water systems. The project included collecting samples from high-risk drinking water sources and analyzing for over 250 Oregon-specific herbicides, insecticides, pharmaceuticals, VOCs (including cleaners), fire retardants, PAHs, personal care products, and plasticizers. Low levels of contaminants were found in 85% of the samples collected, including microbes, steroids, metals, phthalates, and pesticides. This data supplements ambient river data and groundwater data in DEQ's public database for water quality. The data will be accessed and used for many other CWA water quality reports and queries, including the EPA Integrated Report for 303(d) listings.

**Additional Measurement and Characterization Case Examples: Arkansas, California, Illinois, Kansas, Minnesota, Montana, New Jersey, Oregon, Pennsylvania, Tennessee, Texas, Utah, West Virginia.**

## 2. State Implementation Strategies

Implementation strategies serve a valuable purpose and provide direction for states to further source water protection objectives. State strategies can identify priorities based on available data, resources, and potential partnerships. State strategies can also establish how and when to engage other programs and suggest potential opportunities for leveraging.

**Connecticut**

**State Policies:**

The Source Water Protection (SWP) Unit reviewed and offered comments to the State's Office of Policy and Management on the draft State of Connecticut Conservation and Development Policies Plan 2013-2018. One of the key policy recommendations to protect sources of public drinking water that was included in the draft is "utilize an integrated watershed management approach to ensure that high quality existing and potential sources of public drinking water are maintained for human consumption." Projects receiving over $200,000 in state funding must be consistent with the policies in the Conservation and Development Plan. For more information, please see the link below for Connecticut's Source Water Protection Unit: http://www.ct.gov/dph/publicdrinkingwater.

**Kansas**

**Source Water Protection a Priority in the Establishment of State Water Management Plan:**

The Kansas Water Plan (www.kwo.org) outlines state policies and programs for the comprehensive management of water resources. The Plan addresses both water quality and water quantity issues and establishes state priorities for targeting applicable state and federal programs and source water protection planning has been identified as a priority.

Additionally, the *Kansas Nonpoint Source Pollution Management Plan, 2010 Update* includes the following nonpoint source priorities and strategies related to public water supply systems:

- Protect public water supply watersheds and wellhead capture zones used for public water supply through the development and implementation of Source Water Protection Plans (SWPP).
- Maintain a statewide monitoring program to assess water quality conditions and determine attainment of water quality standards.
- Encourage Watershed Restoration and Protection Strategy (WRAPS) stakeholder leadership teams to address source water and wellhead protection where applicable through collaborative, inter-jurisdictional watershed planning and coordination.
- Enhance outreach to public water suppliers to actively participate in applicable WRAPS projects or develop a SWPP if the raw water supply is not addressed through a WRAPS project. Work with WRAPS projects to facilitate SWPP development and implementation within WRAPS watersheds.
- Demonstrate progress in implementation of all approved SWPPs by developing and maintaining a system to effectively track progress in plan implementation and working with the Kansas Department of Health and Environment (KDHE) Public Water Supply Section's Capacity Development Program and other entities to explore potential funding opportunities for enhanced implementation of approved SWPPs.

**Navajo Nation**

**Source Water Protection Project:**

After prioritization of potential contaminant sources, the Navajo Nation Environmental Protection Agency Public Water Systems Supervision Program (NNEPA PWSSP) staff compiled strategies for each source within the public water system that would protect the aquifer(s). For example, the top management strategy for one public water system consisted of decommissioning three improperly abandoned unregulated water wells owned by the Navajo Nation Water Technical, Construction, Operations Branch (the owners). The strategy included providing public education and awareness to the owners and to the Navajo Nation Community (Chapter) on the reasons for decommissioning these wells. It was important to develop the education materials for well decommissioning. Because the Navajo Nation lacks its own Well Abandonment Requirements, the Navajo Nation refers to state well abandonment procedures. These three wells that were decommissioned either provided a direct pathway from potential surface contamination and/or had elevated levels of arsenic and radionuclides from aquifers stratigraphically above the main water bearing formation for the public water supply.

Educational materials were provided for the local Chapter that targeted leaders and the decision makers in community development. Public Education also incorporated domestic waste water requirements or development restrictions within the protection zone of the public water supply. Cooperative management of the source water protection area was ideal in making this project a success. As such, the NNEPA PWSSP makes available to the public GIS maps so that environmental planning is incorporated into community development; where the placement of gas stations, hospitals, waste water systems, to name a few, are an important part of a growing community that must consider the future stability of its drinking water supply. For more information, visit http://navajopublicwater.org/SWAP2.html

**New Mexico**

**Preservation and Protection of the Santa Fe Group Aquifer:**

The Albuquerque area relies on two sources for its drinking water: ground water from the Santa Fe Group Aquifer and San Juan-Chama surface water diverted from the Rio Grande via the San Juan-Chama Drinking Water Project. The aquifer is a vital resource on which not only Albuquerque, but the entire Middle Rio Grande Valley, depends for drinking water. Studies have shown that only about half of the water pumped from the aquifer is being replenished; the rest is "mined" – lost forever. San Juan-Chama surface water reduces dependence on the aquifer, allowing it to recover to serve as a drought reserve in times of minimal precipitation. In just two years of San Juan-Chama Drinking Water Project operation, the U.S. Geological Survey (USGS) has reported that ground water levels are rising in the Albuquerque Basin.

The Office of the State Engineer monitors Water Authority use of San Juan-Chama surface water. Conditions include mandatory reductions in use through water conservation, no diversion during low river flow periods, no consumption of native Rio Grande water, and no impairment to downstream senior water rights holders. The transition to surface water, reuse and recycling, aquifer storage and recovery, along with water conservation, are the foundation of the Water Resources Management Strategy. The goal is to preserve and protect the aquifer to provide a safe and sustainable water supply.

For more information about New Mexico's SWAPP see the following link:
http://www.nmenv.state.nm.us/dwb/water_protection/Index.htm

**Additional State Implementation Strategies Case Examples: Alabama, California, Connecticut, Florida.**

## 3. Partnerships, Integration, and Leveraging

Effective coordination efforts between state source water programs and other Federal and state programs can include establishing partnerships with EPA and state environmental and public health programs (e.g., drinking water and clean water programs), USDA, BLM, USFS, and their state counterparts, and local programs. Approaches can include integrating GIS information, incorporating source water protection considerations into other program priorities, education and outreach, formal and informal coordination mechanisms such as state committees or cross-program MOUs.

**Arkansas**
**Source Water Protection Memorandum of Agreement (MOA) between the Arkansas Department of Health (ADH) and the Arkansas Department of Environmental Quality (ADEQ):**
The MOA is the first formal agreement between the State's SDWA agency and the State's CWA agency in efforts to better utilize data developed for the SWAP program and bridge program boundaries to protect public drinking water supplies. The MOA established coordination efforts to protect the state's drinking water resources by:
Data Sharing:

1) ADH will provide ADEQ with GIS layers depicting public drinking water sources and their source water assessment areas on a quarterly basis.
2) ADEQ will provide ADH with locations of registered UST and above-ground storage tank (AST) systems, systems specifics, reported leaking tank sites and cleanup projects.

Targeted Actions:

1) ADEQ will prioritize inspections of regulated UST facilities in designated source water protection areas and will take enforcement actions as appropriate to ensure the protection of such areas.
2) ADEQ will continue to target impacted source waters or source waters with the greatest potential for impact from leaking USTs or ASTs for cleanup efforts.

The ADH also has an unofficial communication provision with the Arkansas Highway and Transportation Department (AHTD) for sharing of GIS layers depicting public drinking water sources and their source water assessment areas. The agreement includes the following:

1) AHTD screens each highway construction project and determines if the project is located within a source water assessment area.
2) When a construction project is located within a source water assessment area the ADH and public water supplier are notified and are requested to provide recommendations in order to mitigate any potential impacts.

For more information on the Arkansas Source Water Assessment & Protection Program, see the following link: http://www.healthy.arkansas.gov/programsServices/environmentalHealth/Engineering/sourceWaterProtection/

**California**

**State Partnership for Nitrate-Groundwater Pollution Study:**

The California Department of Public Health (CDPH) completed a project working with the State Water Resources Control Board, University of California at Davis, and environmental justice stakeholders to develop a report as mandated by Senate Bill SBX 2-1 to identify and quantify sources of nitrate-groundwater pollution in the Tulare Lake Basin and Salinas Valley. The effort includes identifying the methods and costs to reduce, prevent, and treat nitrate contamination. More information for this project can be found at: http://www.waterboards.ca.gov/water_issues/programs/nitrate_project/index.shtml**.**

CDPH has completed its consultation with the State Water Resources Control Board on a report developed pursuant to Assembly Bill AB 2222. This Assembly Bill project required the State Water Resources Control Board and CDPH to submit to the Legislature a report that identifies communities that rely on contaminated groundwater as a primary source of drinking water, identifies the groundwater sources for the communities and the principal contaminants and other constituents of concern, and identifies potential solutions and funding sources to clean up or treat groundwater. More information for this project can be found at: http://www.swrcb.ca.gov/water_issues/programs/gama/ab2222/index.shtml.

CDPH is a member of the Central Valley Drinking Water Policy Work Group. The working group is continuing its efforts to further develop a drinking water policy to reduce threats to the Sacramento and San Joaquin River watersheds and intakes that serve 23 million people within California's Central Valley. More information for this project can be found at: http://www.swrcb.ca.gov/rwqcb5/water_issues/drinking_water_policy/.

**Colorado**

**MOU for Management and Protection of Source Water Areas on National Forest System Lands:**

Colorado is a headwaters state. Nearly 90% of National Forest lands in Colorado are located in regions that contribute source water to public drinking water supplies. In 2009, the Colorado Department of Public Health and Environment (CDPHE) and the Rocky Mountain Region of the U.S. Forest Service (Forest Service) signed a Memorandum of Understanding (MOU) addressing management and protection of Source Water Areas on National Forest System (NFS) lands in Colorado. The MOU established a framework for CDPHE and the Forest Service to work together in a cooperative manner on issues related to Source Water Protection on NFS lands in Colorado. The MOU recognizes locally-developed source water protection plans, outlines a strategy for sharing data, identifies municipal supply watersheds, identifies priority areas for wildfire treatment, and promotes awareness and education on the importance of safe drinking water sources. Link to MOU: http://www.colorado.gov/cs/Satellite/CDPHE-WQ/CBON/1251596793639

**Connecticut**

**Water Utility Partnership:**

The Source Water Protection (SWP) Unit meets bimonthly with the Connecticut section of the American Water Works Association, Source Water Protection Committee to discuss topics of mutual interest ranging from federal regulations, state statute revisions, local issues. This committee works to develop guidance documents for the annual watershed inspections required by DPH; educational materials for residences and businesses located in public water supply watersheds and sharing information on training events. The SWP Unit also collaborates on a regional and national level (e.g. New England Interstate Water Pollution Control Commission, Ground Water Protection Council, etc.) to ensure that the most effective policies and laws are enacted in Connecticut. For more information, please see the link below for Connecticut's Source Water Protection Unit. http://www.ct.gov/dph/publicdrinkingwater

**District of Columbia**

**Building Early Warning/Emergency Response into Source Water Protection:**

The Potomac Drinking Water Source Protection Partnership's Early Warning/Emergency Response Workgroup, with assistance of EPA Region 3 and the U.S. Department of Transportation conducted a two-day emergency response training and spill response exercise with representatives from drinking water utilities, state and local emergency response departments, and variety of other active state, regional and federal agencies. The Colonial Pipeline Company, an interstate common carrier of petroleum products, was also an active participant.
The goal was to help agencies better prepare for a contaminant spill that affects the sources of drinking water in the Washington, D.C. metropolitan area. Spill response training was conducted on September 16, 2008 and a table-top exercise took place on October 21, 2008. These sessions provided emergency response training, enhanced coordination and communication between all potential responders, improved the understanding of roles and responsibilities, and allowed for discussion of immediate steps to prepare for a future water system-specific emergency incident. The training session provided an overview of the Incident Command System (ICS) framework for emergency response, provided participants with an opportunity to review local and regional emergency response plans related to drinking water, and ended with an exercise to develop an ICS Command Structure for a Potomac spill response. A tabletop exercise addressed a hypothetical oil spill from a pipeline into the Potomac River upstream of the major water supply intakes for the Washington, D.C. metropolitan area. It consisted of a series of facilitated discussions on the following topics:

- Communications
- Oil tracking and forecasting via simulation models or visual observation
- Oil containment measures and options for protecting water supply intakes
- Potential operational changes at intakes and water treatment plants by water utilities
- Emergency water restrictions
- Media and public relations

Many organizations contributed time and resources to help make the event a success by assisting in planning, donating resources, and by preparing presentations. The training and spill exercise in 2008 were helpful learning tools for DWSPP and the After Action Report completed at the end of the training has helped the Partnership build the capacity to respond to a spill in the basin and to ensure source water protection issues are taken into consideration during such an event. Since the event, DWSPP has continued to focus on strengthening communications and building relationships with regional emergency response agencies and with possible contamination threats upstream.

**Illinois**

**McHenry County, Water Resources Management Program:**

McHenry County is one of the fastest growing counties in the nation. In 1990, the population in the county was approximately 182,000. In 2000 it had grown to 260,000: an increase of 42 percent. Projections indicate that population may grow to nearly 350,000 by 2020 and 450,000 by 2030. McHenry County's *only source* for all of their potable water including all private and public water supplies is groundwater. Given the projected growth rate and total reliance on groundwater for natural areas and human use, a Water Resource Action Plan was developed for McHenry County in 2007. The resulting Groundwater Protection Program Task Force recently concluded two years worth of collaborative meetings that aimed at unifying the county and its municipalities in protecting their water resources. In October 2009, final revisions to the Groundwater Protection Program were completed and ready for review and consideration by the McHenry County Board and governments. The plan lists a series of objectives that call for a holistic, coordinated, resource-based approach to water resources planning within the county and the municipalities it serves. This approach includes water conservation,

wastewater re-use, pollution prevention, water supply protection and best management practices for planning and managing groundwater, surface water, potable water supplies, rivers, streams, floodplains, and wetlands. For more information, see the link below.
http://www.co.mchenry.il.us/departments/waterresources/Pages/index.aspx

**Missouri**

**Source Water Protection Integration and Collaboration:**

The Missouri Dept. of Natural Resources (with other collaborators) was selected to participate in the Enabling Drinking Water Source Protection initiative, funded by the U.S. Environmental Protection Agency (EPA), with a pilot program led by the Trust for Public Land. The general focus of this project is to further integrate source water protection efforts with other water quality initiatives such as land use planning, watershed protection efforts, and non-point source pollution management. Existing guidance and informational materials have traditionally been targeted at one group or the other - a byproduct of the overarching federal regulations as described within the federal Clean Water Act and federal Safe Drinking Water Act. A major component of this pilot project is to develop a state-specific action plan to facilitate collaboration between organizations dedicated to protecting general water quality with those that have a narrower focus such as a public water system seeking to protect their unique source water protection area. More information on the Enabling Drinking Water Source Protection Initiative can be found at: http://www.tpl.org/research/land-water/epa-source-water-project/

The Missouri Source Water Protection Program (with other collaborators) is also developing a source water protection workshop curriculum that is focused on facilitating collaboration between public water systems, the communities served, and general water quality interest groups. The first of these workshops was held in May 2011 and included from the Missouri Source Water Protection Program, the Missouri Non-Point Source Pollution program, and non-governmental organizations dedicated to source water protection and watershed protection management.

**Nebraska**

**Best Management Practices and Partnerships to Reduce Nitrate Contamination in Drinking Water:**

The City of Wilber, Nebraska began targeting nitrate contamination of their drinking water when a concentration of 8 ppm nitrates became a frequent occurrence in three of the four city wells. Wilber's wellhead protection (WHP) area encompasses approximately 4000 acres of cropland and resulting land practices have lead to nitrate contamination of the drinking water. To reduce nitrate loading to the groundwater, the City worked collaborated with the University of Nebraska Extension, Lower Big Blue Natural Resources District, Wilber-Clatonia FFA Chapter, Nebraska Rural Water Association and the Natural Resources and Conservation Service to educate and encourage producers to implement nitrogen and irrigation best management practices within the WHP area.

Source Water Protection grant funds were utilized to fund vadose zone (area between water table and land surface) sampling to understand the extent of nitrate contamination below the crop's root zone in the WHP area. Nitrates in the vadose zone are inaccessible to the plant and thus destined to leach into groundwater. A cost-share program was also offered to farmers and landowners in the WHP area to install irrigation water flow meters, evapo-transpiration (ET) gauges and soil moisture probes. These items allow the producer to more accurately time irrigation thus enabling the producer to use less groundwater and reduce the amount of nitrogen fertilizer being leached out of the crops root zone. Once meters were installed, 3 years of records were recorded. All irrigation and domestic wells within the WHP area were also sampled to determine nitrate and coliform levels. When surveyed about the irrigation management practices, producers reported saving 1-2 pivot rotations per year resulting in approximately 2 acre-inch water. This project has been expanded and taken district-wide and incorporated in the WHP area of other communities.

**New Jersey**

**Source Water Protection for the New Jersey Highlands:**

New Jersey's Highlands Region is an 860,000-acre swath of land that is the source of drinking water for more than half the state's residents. In August 2004, the Highlands Water Protection and Planning Act charged an 11-member Highland Council with developing a Regional Master Plan. The Council made use of a Highlands resources joint study by the USGS, Rutgers University and the U.S. Forest Service to set out a 410,000-acre Preservation Area where stringent water quality standards and pollution controls were to be imposed and development was to be strictly controlled. The remainder of the Highlands was designated as the Planning Area, in which development would be dictated by "smart growth" principles. The Master Plan was designed to put an end to the loss and fragmentation of Highlands land and insure the quality and quantity of vital drinking water sources. More information about the Highlands Water Protection and Planning Act can be found at: http://www.state.nj.us/dep/highlands/.

**North Carolina**

**North Carolina Source Water Collaborative and other Source Water Protection Integration Initiatives:**

The North Carolina Source Water Protection Program participated in a national project designed to align water quality protection, land use programs, and policy decisions to better protect drinking water sources. This project resulted in a series of new initiatives. For example, North Carolina has established a statewide Source Water Collaborative to help incentivize and promote local source water protection. This Collaborative includes professional associations, nonprofit organizations, university programs, Councils of Government, and state agencies. Other promising initiatives include increased cooperation with Clean Water Act programs and the development of an awards program to recognize outstanding drinking water protection projects. Additionally, the North Carolina Source Water Protection Program administers a low interest loan program for land conservation projects, where such projects serve to protect a public drinking water source. More information about the North Carolina Source Water Collaborative can be found at: http://www.ncwater.org/pws/swap/Collaborative.html.

**North Dakota**

**Increased Capacity for Protecting Source Water from Oil and Gas Contamination:**

Due to the increase in oil activity in North Dakota, the state has been dealing with the issues that arise from production processes, including source water protection. The North Dakota Department of Health (NDDH) has been working in conjunction with the state Division of Oil and Gas as well as North Dakota Rural Water Systems (NDRWS) on protection measures. The greatest oil activity is in the western half of the state where surface water is the primary source of drinking water. The NDDH and several state agencies are reviewing options designed to minimize potential impacts to source water protection areas from oil-field related spills. The NDDH with NDRWS is working towards greater public education and awareness of zoning issues within wellhead protection areas. Specifically, the work consists of visiting individual systems, setting up town meetings, and distributing informational flyers. Individual systems are noted as paying closer attention to the oil and gas production activities in the nearby areas. The NDDH is receiving a higher volume of calls regarding source water information and well testing, particularly for privately-owned wells. Currently, the NDDH is developing a specialized team with members from several divisions including water quality, waste management, and air quality that will focus on oil and gas spill response and remediation, ranging from trucking and road accidents to pipeline leaks and on-site spills.

**Oregon**

**Clean Water Act Integrated Reports –Waters with Drinking Water Beneficial Use Considered for Listing:**

DEQ drinking water staff coordinates regularly with Clean Water Act (CWA) staff to revise standards and new stream listings for "water quality limited" streams in Oregon. DEQ's drinking water protection staff and CWA implementation staff developed a consistent methodology to include the data for drinking water MCLs into the

existing water quality criteria under the CWA for purposes of the 303(d) data queries. The first step is a thorough cross-walk of MCLs versus existing water quality standards. Oregon's EPA Integrated Reports apply the narrative criterion in state rules (OAR 340-041-0007(11)) that establishes the *statewide goal of protecting the potability of drinking water*. *For the most recent CWA 303(d) listing, DEQ obtained records from public water system (PWS) operators for drinking water systems,* including the number of shutdowns occurring due to turbidity levels that exceeded the system's operating capacity. This data collection resulted in listing specific source waters as "*Category 5: Water quality limited, 303(d) list, TMDL needed" under the CWA*. DEQ proposed that five water bodies be on the Water Quality Limited 303(d) list due solely to drinking water beneficial use limitations. Drinking water staff will work with the TMDL staff to address the TMDL listed source waters.

**South Carolina**

**Collaboration between Source Water Protection and Drinking Water Permitting Programs:**

In addition to the standard methods for Source Water Protection, such as education and outreach, technical assistance to water-system operators, and SRF-loan-award incentives; the South Carolina Department of Health and Environmental Control developed a cooperative approach between the Source Water Protection Program and the Drinking Water Program's permitting section for all new groundwater sources. Technical advice is provided by hydrogeologists to permit writers with respect to the susceptibility of proposed wells to contamination and to the feasibility of the proposed well to produce both the desired well yield and acceptable water quality with the proposed well location and design.

An example of this cooperation involved the replacement of a defective well at a rural convenience store where publicly supplied water was not available. While reviewing well replacement sites, the Source Water Protection Program reviewed potential contamination sources using GIS and found that a former, leaking underground-storage tank with residual free product was present in the area. Recommendations to the Drinking Water Program included relocating the new well based on hydrogeological conditions and the geometry of the petroleum-contamination plume. Also, the required depth of well was increased to reach a better confined (protected) aquifer and the well design was modified to include additional casing and grout. The well permit also included the requirement that petroleum constituents be included as compliance-monitoring parameters.

**Utah**

**Working with Federal Land Managers:**

In Utah, over 70% of the land is Federal or State property. The DDW has worked with USFS and BLM to advance protection of drinking water sources. DDW has reached out to educate other federal and state agencies about protection of drinking water. Drinking Water Source Protection Zones are provided as GIS layers to Federal agencies and other land managers upon request. Federal agencies have used the DWSP GIS layers to protect drinking water sources when making land use decisions. For example, see Utah BLM's Instruction Memorandum on "Protection of Ground Water Associated with Oil and Gas Leasing, Exploration and Development." Drinking Water Source Protection Zones are offered special protection.
http://www.blm.gov/ut/st/en/prog/energy/oil_and_gas/ground_water_protection.html

**West Virginia**

**Regional Source Water Protection Partnerships:**

The West Virginia Source Water Assessment and Protection (SWAP) program continues to participate in several regional SWAP projects such as the Potomac River Basin Drinking Water Source Protection Partnership, facilitated through the Interstate Commission on the Potomac River Basin (see website at http://www.potomacdwspp.org/), and the Ohio River Drinking Water Source Protection work group, facilitated through the Ohio River Valley Water Sanitation Commission (http://www.orsanco.org/source-water-protection).

**Additional Partnerships, Integration, and Leveraging Case Examples: Alaska, Florida, Indiana, Iowa, Louisiana, Maine, Minnesota, Nevada, Oregon, Rhode Island, South Dakota, Vermont.**

## 4. Motivating Local Activity

State source water protection programs have a variety of ways to motivate and assist local source water protection implementation. The general idea is to provide incentives for action and data/information about the kinds of actions that are needed. An important feature of many of the key components for motivating local action is easy to use tools that are appropriate for local capabilities and interests. A combination of approaches may be most effective. Subcategories to help describe activities related to local activity include: funding assistance; land acquisition; local ordinances; outreach, training, and workshops; developing source water protection plans; and use of multiple program tools.

### *Developing Source Water Protection Plans*

**Alabama**
**Source Water Protection Plan Applied in Development Decision:**
The Alabama Rural Water Association assisted the Leeds Water Works Board (LWWB) with the preparation and completion of a Source Water Protection Plan (SWPP). The LWWB is located in Jefferson County, Alabama and serves a population of approximately 20,000. The utility has four groundwater wells and two springs. The average daily demand at the time of the SWPP was three million gallons per day. The LWWB chose to use public education as their primary venue for protecting their water sources. The LWWB was able to put their SWPP into action when a private company was planning to build a salvage yard near one of the utility's sources. During the permitting and planning phase of the project, the LWWB utilized their SWPP to show that the salvage yard was up-gradient to a water source and that there existed a potential for contamination to that source from any leachate generated at the salvage yard. The developers of the salvage yard decided it was best to find another suitable location. More information about the Leeds Water Works source water protection plan at: http://www.lwwb.com/images/report.pdf.

**Delaware**
**Source Water Protection Guidance Manual for the Local Governments of Delaware "A Toolbox for the Protection of Public Drinking Water Supplies in Delaware:"**
The State of Delaware Source Water Protection Law of 2001 (7 Del. C. 6081, 6082, 6083) requires local governments with year-round populations of 2,000 or greater to implement measures to protect the quality and quantity of public water supplies within delineated surface water, wellhead, and ground-water recharge areas by 2007. The purpose of this manual is:

1. To provide local governments with a concise listing of protection measures meant to protect drinking water and to comply with the legislation.
2. To encourage jurisdictions with year-round populations of less than 2,000 to adopt measures to protect their sources of public drinking water.

This manual is an important component that provides basic information on how local governments might tailor their water protection efforts. To view the guidance manual, see the link below.
http://www.wr.udel.edu/swaphome/Publications/SWPguidancemanual.html

**Florida**

**Engaging Stakeholders to Develop Watershed-Based Source Water Protection Plans:**

In Florida, a comprehensive watershed approach is used to provide source water protection for rural communities and agricultural areas. The Florida Rural Water Association and the Florida Source Water Protection Program work with communities and other interested parties to develop a source water protection plan. Stakeholders, including city officials, councils, utilities, agricultural and business interests and concerned citizens, identify potential source water threats within a watershed and develop preventive and educational measures to protect source water within the watershed. The watershed approach allows greater utility of resources and efforts while raising public awareness over a large region. This approach can also provide a greater degree of protection for individual systems where protection areas and potential sources may overlap. In 2010, 11 "watershed" source water protection plans were developed for various areas throughout northern and central Florida. For more information, contact Florida Department of Environmental Protection (http://www.dep.state.fl.us/swapp).

**Kentucky**

**Funding Incentive for Developing Water Supply Plans:**

The Kentucky Water Supply Plan statute provides an important funding incentive to counties and municipalities to develop Water Supply Plans. The Water Supply Plans require either a Source Water Protection Area (surface water systems) or Wellhead Protection Plan (groundwater systems) be developed for every system. Having a Water Supply Plan became a requirement for requesting state and federal funding. Partial funding to local governments for developing Water Supply Plans was available through July 1996. Then after July 1999, KRS 151.118 mandated that the Natural Resources and Environmental Protection Cabinet *"shall not endorse projects that impact water under inter-governmental review for any county or municipality without an approved water supply plan."* This language, for the most part, requires local governments to have Water Supply Plans, as most governmentally funded projects require some type of water service. Counties without approved water supply plans will not be eligible for state or federal funds. This includes access to the state revolving funds created by the Clean Water and Safe Drinking Water Acts, community development block grants, and funding assistance through the Kentucky Governor's Water Resources Development Commission. The Kentucky Water Supply Plan Statute can be found at: http://www.lrc.state.ky.us/kar/401/004/220.htm**.**

**Minnesota**

**Source Water Protection Partnership Aimed at Reducing Nitrate in City Drinking Water:**

The city of Cold Spring is working with local landowners and others to reduce the amount of nitrogen fertilizer applications in its wellhead protection area. This is being done to address concerns about rising nitrate nitrogen levels in the city's drinking water. The city has partnered with the MDH, Minnesota Department of Agriculture, Minnesota Rural Water Association, Stearns County, and the Natural Resource Conservation Service and has benefited from a Source Water Protection Plan Implementation grant from the Legacy Fund.

The City formed a team, studied the issue, prioritized fields where recharge to the city's water supply wells was likely occurring and worked with area farmers and landowners to begin reducing nitrate loading. Cold Spring purchased nitrogen-inhibitor products from the local agriculture co-op, which applied the products to farmers' fields, reducing fertilizer levels from 8 to 16 percent of their previous application rates. The use of nitrogen inhibitors, combined with the additional reduction in applied fertilizer elsewhere, resulted in a decrease of 4,100 pounds of nitrogen applied on 277 acres near the city's wells. The partnership has increased the trust and cooperation between the city and local farmers and landowners. Cold Spring developed a groundwater quality monitoring plan for its wellhead protection area and has installed four monitoring wells to measure the long-term effectiveness of nitrogen reduction efforts. More information on Minnesota's source water protection program, the Cold Spring, and other Minnesota communities can be found at: http://www.health.state.mn.us/divs/eh/water/com/dwar/report2010.pdf.

**Nevada**

**Countywide Community Source Water Protection Program:**

Since 2009, NDEP's Integrated Source Water Protection Program (ISWPP) has been working in several counties to assist the development of Community Source Water Protection Programs. Douglas County is the first community to develop a countywide plan under the ISWPP and to commit to a countywide approach to protecting their water resources. The "Community Wellhead Protection Plan for Public Water Systems in Douglas County, Nevada" (Plan) was presented to the Douglas County Board of Commissioners for formal approval adoption of the plan in May 2012. The board unanimously voted in favor of adopting the plan and incorporating it into the Douglas County Master Plan. Subsequently, NDEP formally endorsed the Plan and provides ongoing support for implementation activities. The Plan establishes wellhead protection areas for every public water system well located within Douglas County.

The most significant management strategy implemented is a preemptive protection measure. It is an agreement by the Douglas County Planning Department to submit new development proposals to affected public water systems for comment prior to approval of any new developments in wellhead protection areas. The plan review process is currently being modified to include consideration of all wellhead protection areas and comments that are made by the public water systems will be included in the developments' "Conditions for Approval." The County has also committed to exploring the possibility of developing a countywide wellhead protection ordinance in the future. Land and business owners located in the wellhead protection areas have been formally notified and have received educational materials regarding their sensitive location. Douglas County developed a website (douglascountycleanwater.com) to highlight the plan, its goals and present it to the residents of the community. The community has also adopted a countywide education curriculum targeting 6$^{th}$ graders throughout the county. The "Dynamic Earth" science kit offers education on basic water concepts: water on earth, the water cycle, groundwater supplies, and contaminants of concern. Surface and groundwater model demonstrations for the classes are also an option for teachers and have become very popular. For more information about the "Dynamic Earth" science kit, visit this website: http://douglascountycleanwater.com/6th-graders/.

**Ohio**

**SWEET Teams help Versailles, Ohio Produce a Source Water Protection Plan:**

An Ohio Environmental Protection Agency (OEPA) Source Water Environmental Education Team (SWEET) helped the Village of Versailles develop and complete a SWP plan at a cost of $14,800. The Village intends to use the plan to heighten the local awareness of the importance and value of its water resource and develop measures to protect its water supply. For more information on Ohio EPA SWEET Teams, visit this link: http://wwwapp.epa.ohio.gov/ddagw/SWEET/**.**

**Rhode Island**

**Source Water Protection Plans completed by Atlantic States Rural Water Association:**

Since 2009, Elizabeth Myre, a source water circuit rider funded by EPA under the National Rural Water Association, created detailed source water assessments and management plans for three individual public drinking water systems and one larger community with multiple systems. The plans included recommendations from community leaders, water utility staff and other state programs such as the Non-Point Source Education for Municipal Officials program (NEMO). The plans included recommendations to reduce sources of nitrate, such as fertilizers, cesspools or septic systems, within wellhead protection areas.

**Texas**

**Supporting Source Water Protection Programs for Public Water Systems:**

The Texas Source Water Protection (SWP) Program is currently working with over 30 Public Water Systems to complete their SWP programs. This is accomplished through the contractor Atkins North America. Texas Rural

Water Association who also provides SWP technical assistance through SWP workshops. Systems attend these workshops and learn valuable knowledge that enables them to complete a new project or update an existing SWP project. The Texas Commission on Environmental Quality (TCEQ) Drinking Water Protection Team assists water systems by providing maps, databases, best management practice recommendations and inventory technical assistance. The SWP Program is currently working with a contractor to complete an online Source Water Protection Web Tool. This online tool will guide water systems through the SWP process and assist them in completing their SWP program.
For more information on Texas' Source Water Protection Program, see the links below.
http://www.tceq.texas.gov/drinkingwater/SWAP, http://swaptexas.org/success_stories.htm and http://swaptexas.org/

**Virginia**
**Wellhead Protection:**
Source Water Protection Programs are voluntary in the Commonwealth of Virginia. The Office of Drinking Water encourages and financially supports community's efforts to develop source water protection plans. These programs provide technical support to assist small water systems serving less than 10,000 people. Participation in this program has enabled several small water systems to prepare and implement site-specific Source Water Protection Plans, while a number of other waterworks are currently in the process of completing their plans. For more information about the Commonwealth of Virginia's SWAP, visit the website: http://www.vdh.state.va.us/ODW/SourceWaterAssessment.htm/.

**Wyoming**
**Value of Town's Source Water Protection Plan during Emergency Response:**
The Wind River runs through one of the most picturesque canyons in the world, and provides surface water sources to a number of communities along its path. In 2010 at the height of the spring runoff, the river was running in excess of 7,000 CFS (normally 2,400 CFS). A train derailment occurred at the mouth of the canyon only five miles upriver from the river intake of the Town of Thermopolis, Wyoming. Thermopolis is home to the world's largest natural mineral hot springs, and has hundreds of thousands of visitors annually. The Town has a population of approximately 2,000 – 3,000. At the time of the accident, Wyoming Association of Rural Water Systems (WARWS) or Wyoming Rural Water staff was onsite assisting the South Thermopolis Water and Sewer District (a consecutive system to the Town of Thermopolis), in updating its emergency response plan. The Town of Thermopolis has a SWP Plan in place. The value of having a SWP Plan in place, and working with consecutive systems to update their plans during this emergency, became apparent. The Town's operators were able to shut down the intakes before contaminants reached them and were able to provide invaluable information to the emergency team dispatched from Burlington Northern Railroad and the National Transportation Safety Board.

**Additional Developing Source Water Protection Plans Case Examples: Hawaii, Illinois.**

### *Local Ordinances*

**South Dakota**
**SD Department of Environment and Natural Resources Supports County Ordinances:**
County ordinances remain the main avenue for specific wellhead/source water area requirements and restrictions. South Dakota Department of Environment and Natural Resources (DENR) continues to actively work with the counties developing ordinances by providing technical assistance and supplying them with information such as Source Water Assessment Plan (SWAP) data, model ordinances, and shallow aquifer maps. DENR has worked with the East Dakota Water Development District to protect drinking water in the eastern part of the state. A total of 10 counties within the EDWDD have implemented overlay districts and ordinances to protect drinking water. For more information, visit http://www.eastdakota.org/. An additional 5 counties in eastern South Dakota outside the EDWDD have adopted wellhead/source water protection ordinances.

**Utah**

**Land Management Strategies:**

In Utah, cities and towns have extraterritorial jurisdiction to enact ordinances to protect a stream or "source" from which their water is taken "for 15 miles upstream and for a distance of 300 feet on each side of such stream." This also applies to ground-water sources. This authority is based on the Municipal Code 10-8-15, which can be reviewed here: http://le.utah.gov/~code/TITLE10/htm/10_08_001500.htm**.**

Land management strategies include zoning and subdivision ordinances, site plan reviews, design and operating standards, source prohibitions, purchase of property and development rights, public education programs, ground water monitoring, etc. Some examples are available at this link: http://www.drinkingwater.utah.gov/documents/spec_services/County_Ordinances.pdf**.**

**Wisconsin**

**Town of Empire, Wisconsin Critical Areas Overlay District:**

The Town of Empire in Fond du Lac County has developed a Critical Areas Overlay District that minimizes development in areas prone to unwanted soil erosion and groundwater contamination, and on sites difficult to develop in a safe manner. It also preserves unique and valuable geologic and other natural resource features such as the Niagara Escarpment and woodland. The ordinance specifies a ridgeline buffer, lists prohibited uses, states grading restrictions for roads, requires vegetative screening of buildings on the ridge, preserves existing vegetation and significant rock outcroppings and limits impervious surface. For more information, visit http://www.uwsp.edu/cnr-ap/clue/Documents/PlanImplementation/Overlay_Zoning.pdf.

**Additional Local Ordinances Case Examples: Idaho, Maryland, Nevada, South Dakota, Washington.**

### *Funding Assistance*

**Alaska**

**Multiple Grant Programs Protect Community Water Systems:**

Drinking Water Protection has recently partnered with the Alaska DEC/Division of Water to use the Alaska Clean Water Actions (ACWA) Grant process to administer a small grant program for community water systems to implement drinking water protection strategies. The ACWA grant program is mainly funded by CWA Sec 319, but the allocation of DWSRF funding has allowed them to expand projects to include the protection of public drinking water sources. In FY11, $12,000 was allocated from DWSRF to the Gulkana Tribal Village Council to assist the Village of Gulkana to decommission up to 18 abandoned wells located in close proximity to their active community well. It is hoped that this project will highlight the importance and need for other Alaskan communities to decommission abandoned wells. Many lessons were learned during this project. The plan is to use the lessons learned from this experience to help the DEC-Drinking Water Program develop policy and procedures necessary to promote the decommissioning of abandoned wells throughout Alaska. For more information, see the link below.
http://dec.alaska.gov/eh/dw/DWP/source_water.html

**Colorado**

**Protection Planning Grant Program**

Funding for protection planning is available from the State Drinking Water Revolving Fund (SDWRF) set-asides. The SDWRF set-asides enable the SWAP program to provide financial support for protection plan development. These set-asides allow the state to utilize a percentage of its capitalization grant to assist in the development of local drinking water protection initiatives and other State projects. The grant funds are awarded for two types of projects: Pilot Planning Projects and Development and Implementation Projects.

Pilot Planning Project Grants support exemplary and comprehensive source water protection plans. Once completed, these pilot projects serve as examples to others interested in developing plans to protect their drinking water sources. These grants can range up to $50,000 and require a one to one financial match (cash or in-kind match). The Pilot Planning grants also require the protection planning entity to evaluate the expenses related to replacing the current water source (i.e. acquiring water rights, restructuring water supply system, economic impacts, etc.). The additional cost analysis provides an estimated value of water resources to further understand the importance and significance of source water protection planning.

Development and Implementation Grants are awarded to public water systems and representative stakeholders committed to developing a source water protection plan. Grants up to $5,000 are awarded for plan development and for implementation. A one to one financial match (cash or in-kind) is required. More information on the grant program can be found at http://www.colorado.gov/cs/Satellite?c=Page&childpagename=CDPHE-WQ%2FCBONLayout&cid=1251597403016&pagename=CBONWrapper.

**Hawaii**

**Wellhead Protection – Financial Assistance Program:**

The DOH's Source Water Assessment and Protection (SWAP) Program has developed a Wellhead Protection – Financial Assistance Program (WHP-FAP) to assist PWS planning and implement source water protection. DOH is currently working with the County Water Departments and private Public Water Systems (PWSs) on WHP-FAP contracts. To date, the County of Maui, Department of Water Supply has developed draft protection strategies for the islands of Maui, Molokai, and Lanai, developed well siting criteria, worked with the County Planning Department to incorporate SWAP Areas into its review process, and has produced media ads related to water protection. Through December 2012, DOH issued almost $1.9 million in WHP development and/or implementation contracts to the County water departments, University of Hawaii, and a few private PWSs for protection planning activities such as hazardous waste remediation of a water shaft located near a drinking water well, remediation and upgrading of on-site disposal systems (cesspools and septic systems) located near drinking water sources, and developing and implementing Project Water Education for Teachers (WET) throughout the State of Hawaii. For more information, see the link below.
http://hawaii.gov/health/environmental/water/sdwb/swap/swap.html

**Idaho**

**SWP Grant Program:**

DEQ established a SWP grant program in 2008 and awarded approximately $200,000 in funding in 2011. An average of 12 -14 local and regional projects are selected each year for funding. For example, in 2010 DEQ provided funding to assist Bannock County with the development of a Ground Water Resource Protection Overlay District to protect critical ground water and drinking water sources in the county. A Citizens Advisory Committee was established to review recommendations of the technical committee, provide advice to the County, and provide public outreach. DEQ assisted with several public meetings to educate the public on the recommendations of the Citizens Advisory Committee to protect ground water in the county. More information on the SWP grant program and a list of funded projects is available at www.deq.idaho.gov/SWPgrant.

**Louisiana**

**Sibley Lake Watershed Individual Sewage Treatment System Improvement Project:**

The Louisiana Department of Environmental Quality's Source Water Protection Program supported the Sibley Lake Watershed Individual Sewage Treatment System Improvement Project with a Clean Water Act §319 grant of $240,300. The City of Natchitoches provided a $160,200 match. The goal of the project was to protect Sibley Lake through inventory and inspection of all individual sewage treatment systems within a half-mile distance of the lake. Once the systems were identified, grant money was partnered with individual property owner funds to repair or replace malfunctioning systems identified as a significant contributing factor to the declining water quality.

Through the cooperation of LDEQ, local health department personnel, and individual Sibley Lake residents, the City of Natchitoches inspected a total of 818 individual sewage treatment systems. Of this total, 171 or 21% were determined to be failed systems. Of the 171 failed systems identified, 147 systems were repaired or replaced. (Two systems were on the same property requiring only one replacement.) Of the 171 failed systems identified, there were 23 property owners that declined to respond to the city's invitation to take advantage of the grant opportunity. A list of these systems was provided to the Louisiana Department of Health and Hospitals for their records. The percentage of failed systems improved through this project was 86%. More on the Sibley Lake Project is available at:
http://www.deq.louisiana.gov/portal/Portals/0/evaluation/aeps/DWPP/Sibley%20Lake%20Watershed%20Individual%20Sewage%20Treatment%20System%20Improvement%20Project.doc.

**Washington**
**Providing Technical Assistance and Funding for Source Water Protection Activities:**
Technical Assistance – In 2007, the Washington State Department of Health (WSDH) coordinated source water protection (SWP) technical and financial assistance to the City of McCleary to evaluate threats to its shallow aquifer, Wildcat Creek. WSDH helped McCleary develop a workgroup including Evergreen Rural Water of Washington, Grays Harbor County, private consultants, citizens, and WSDH staff. WSDH also provided funding through the Drinking Water State Revolving Fund (DWSRF) SWP set-asides to enable the city to hire a consultant, conduct the study, and implement recommendations. As a result of this work, Grays Harbor County adopted a critical aquifer recharge area ordinance. WSDH continues to provide similar source water protection assistance around the state, including Town of Carbonado, City of Ilwaco, City of Spokane, City of Port Townsend, City of Walla Walla, Clark County, City of Quincy, Island County, and many other areas.

Funding – WSDH uses some of the Drinking Water State Revolving Fund set-asides to fund a source water protection grant program. WSDH provides up to $30,000 in grant funding for high priority source water protection projects that help prevent or resolve water quantity and water quality problems. Through this grant program, WSDH has funded several regional hydrogeologic studies; a watershed protection evaluation for the Town of Carbonado; and a feasibility study for Freeman School District to determine best options for addressing carbon tetrachloride contamination of the aquifer. WSDH also provides grants to local governments to update their Geographic Information System (GIS) service area boundary information. This information supports source water protection activities such as improved emergency preparedness and response. For more information, see the following link. http://www.doh.wa.gov/ehp/dw/sw/default.htm

**West Virginia**
**Grants to Community Public Water Systems:**
West Virginia made funding grants available to community public water systems through the Drinking Water State Revolving Fund. Eligible Source Water Assessment and Protection (SWAP) projects include source water protection measures and activities in existing source water protection areas and the associated communities. Projects are expected to provide benefits to drinking water quality, quantity, education, and/or security.

**Additional Funding Assistance Case Example: Maryland.**

### *Land Acquisition*

**New Jersey**
**Open Space Tax Program:**
New Jersey has Open Space Tax Programs on both the county and municipal levels: all 21 counties impose a property tax (from ¼ to 6 cents per $100 of assessed value) and approximately 40 percent of the state's municipalities do so as well. The money collected can be used to purchase land at market value or conservation

easements, to preserve farmland, and to develop or improve parkland. The money does not go into the general fund and the purchases made serve to slow down development that can sometimes raise concerns for source water.

**Vermont**

**St. Albans Water Department & Brandon Fire District #1 – Implemented from Local Level:**

Many systems in Vermont are actively protecting their water supplies, such as the City of St. Albans Water Department which has purchased a total of 850 acres around its reservoirs. Recently, St. Albans purchased an additional 100 acres around one of their primary reservoirs through the VT Drinking Water SRF land acquisition program.

The City of St. Albans, Vermont has implemented a multi-faceted source water protection program as a result of numerous potential contaminants identified at their surface water sources, Lake Champlain and Fairfax reservoir. With assistance from the Vermont Rural Water Association, the system operators continue to educate Lake Champlain SPA residents on shoreline stabilization and septic maintenance. The replacement of an undersized culvert that was causing sediment to erode and accumulate in the Fairfax Reservoir was funded by the Vermont Better Backroads Program with labor provided by the Town of Fairfax. Thousands of migratory geese have been prevented from landing near intakes with assistance from the USDA Animal and Plant Health Inspection Service (APHIS) Wildlife Services program. Fairfax Reservoir watershed landowners are encouraged to use proper techniques to prevent erosion during maple sugaring season and limit use of ATVs and snowmobiles. The St. Albans Water Department has worked to provide funding for farmers to take measures to reduce runoff on fields near water supply intakes with assistance from the Vermont Agency of Agriculture and USDA Farm Service Agency. Additionally, through the basin planning process, the system has sought to add stormwater controls such as modified rain gardens and grass waterways to slow runoff and potentially increase the uptake of nutrients.

### *Outreach, Training, Workshops*

**Connecticut**

**Stakeholder Workshops Lead to Source Water Protection Activities:**

Connecticut's Source Water Protection (SWP) Unit, along with the EPA and US Geological Survey held a stakeholder workshop in October, 2010 to address local source water protection issues. Topics included: Cyanotoxins, low impact development and new techniques for water quality protection and management. The SWP Unit has begun an effort to disseminate information on the Drinking Water Section website regarding drinking water supply impacts due to Cyanobacteria, Harmful Algal Blooms (HAB's) and invasive freshwater alga. The SWP Unit will participate in a watershed inspector training that is being held in April 2013 to assist personnel of water utilities who annually inspect properties within drinking water watersheds for risks to public water supplies. For more information, please see the link below for Connecticut's Source Water Protection Unit: http://www.ct.gov/dph/publicdrinkingwater.

**Idaho**

**Education, Outreach and Training:**

Idaho Department of Environmental Quality's (DEQ) SWP program has developed a variety of education and outreach materials and provides SWP information to communities through public service announcements, presentations, outreach, and training. For example, in 2011 DEQ presented seven full-day workshops throughout the state on ground water fundamentals. The workshops, which targeted local government officials and public water systems operators, provided information on basic hydrogeologic concepts, ground water flow, well construction and source water protection. Over 230 people attended the workshops.

**Indiana**

**Public Education Campaign Raises Awareness about Wellhead Protection:**

In 2000, Seelyville Water Works opened its own wellfield and water treatment plant after years of buying water from a larger system in the County. Once their new plant came on line, Seelyville's water was characterized by discoloration, taste and odor, resulting in public concern, negative media coverage and state enforcement orders. Seelyville made adjustments and corrected the treatment problems to bring the system into compliance, but also used the situation to generate interest in wellhead protection. Seelyville formed a Local Planning Team which developed a local public education campaign to raise awareness of the importance of protection. Seelyville Water Works built an educational table top display on water quality that they have taken to community events. At these events, Seelyville Water Works personnel talk to people about where their water comes from and the steps they can take to keep it safe and healthy to drink. They also use these events to survey public concerns and answer questions. With only one point source (a buried underground storage tank) located within their 5 year time of travel zone, they have worked with the property owner and IDEM in removing this tank. Future activities planned include: finding and sealing abandoned wells, promoting household hazardous waste pick-up days, exploring overlay zoning with Vigo County, and additional educational efforts. For more information about Indiana's Source Water Protection efforts, visit http://www.in.gov/idem/4142.htm.

**Michigan**

**Kalamazoo Michigan Movie Trailer Outreach:**

The City of Kalamazoo Wellhead Protection Committee has developed, with the help of a production company, eight 30-second movie trailer animated advertisements shown at a 10-movie theater complex. Three ads at a time are shown before the start of every movie and are replaced every few months with a new group of three. The ads are designed to engage the audience about their drinking of groundwater, the importance of protecting the source of groundwater, the threats to groundwater, and a website link to obtain more information. In addition, the WHP Committee prepared three "still" ads included in a movie trailer for another 14-screen movie theater in the City. For more information, visit http://www.kalamazoocity.org/portal/water.php?news_id=101**.**

**Montana**

**On-Site Wastewater Training Protects Source Water:**

The Montana Source Water Protection (SWP) Program continues to provide training approximately 10–15 times per year to citizens, realtors, water system operators, and well drillers on the operation and maintenance of domestic wells and septic systems. This was borne out of the most prevalent/most threatening potential contaminant source (PCS) process which identified on-site wastewater as a significant concern to public drinking water sources. SWP staff offer the training though their standard water system operator training venues, through local realtor associations, and through the Board of water well contractors. Attendance ranges from about 15 in small communities up to 100 attendees.

An outcome of this process over the past several years is the development of more reader-friendly education materials on the operation of wells and septic systems. The "Under Ground Comics" has been well received and about 4,800 copies have been distributed in the past 6 months. For an example of the 'Septic and Well Care' comic, visit http://www.deq.mt.gov/images/comicBook/SepticWellComic.htm.
Information and handouts are available at the SWPP website at: http://www.deq.mt.gov/wqinfo/swp/**.**

**New Hampshire**

**Annual Drinking Water Source Protection Workshop:**

Each year, the New Hampshire Department of Environmental Services' (NHDES) Drinking Water Source Protection Program holds an all-day SWP workshop in cooperation with the American Ground Water Trust. In 2012, the workshop featured a morning plenary session and four afternoon tracks and drew over 200 attendees,

primarily water system operators and managers, municipal officials, local and regional planners, and consultants. NHDES's annual SWP Awards are presented at the workshop.
For more information, see http://des.nh.gov/organization/divisions/water/dwgb/dwspp/workshop.htm**.**

**Oklahoma**
**Communication Efforts to Inform Communities and Decision Makers:**
The Department of Environmental Quality (DEQ), specifically the groundwater support staff, has produced eye-catching flyers, fact sheets, and bill inserts that communities can use to educate their customers. These materials can be customized to fit a community's specific needs. For SWP, a flyer insert encouraged the use of a slow release fertilizer and maintaining taller grass to achieve a lush lawn by highlighting the fact that it "isn't just your lawn that is affected when you over- fertilize." A monthly newsletter, the Wellhead Word, is published to help community groundwater systems implement wellhead protection. Partnerships are the common denominator of ensuring success of the DEQ Wellhead Program. A survey to regular newsletter recipients asked how they were executing a Wellhead Protection Program (WHPP), what outreach material would be useful and how DEQ could improve the program. Several readers who have not implemented a WHPP cited funding as the reason why. In response, DEQ developed a presentation geared toward community leaders and decision makers to notify them of the benefits of a WHPP. In these times of budget cuts and financial hardships, it is important that heads of communities are making informed decisions. For more information about wellhead outreach materials, visit: http://www.deq.state.ok.us/eclsnew/wellheadprotection/index.htm.

DEQ also alerted communities about services offered free of charge, such as using GPS and navigation equipment to capture the location information of wells and potential sources of contamination. During emergency situations, such as a tornado, knowing the locations of threats to drinking water is vital in saving time and resources in ensuring the drinking water source's security. A successful WHPP cannot safeguard them from disasters, but it can help to ensure that safe drinking water is available to their citizens.

**Additional Outreach, Training, Workshops Case Examples: Navajo Nation, North Dakota, Texas, Vermont.**

### *Use of Multiple Protection Tools*

**Iowa**
**Non-targeted systems:**
Iowa's city of DeSoto won the American Water Works Association's (AWWA) national award for Exemplary Source Water Protection (SWP) in 2012. Located along the South Raccoon River, the City uses shallow wells in the sand and gravel next to the river for its drinking water. For protecting their source water, in addition to locating and managing point sources, DeSoto was able to convert most of the 2-year capture zone from row crop to native vegetation using the USDA wellhead Conservation Reserve Program (CRP) program. Nitrates have decreased in raw and finished water since that conversion. For more information about the AWWA Exemplary Awards Program, visit: http://www.awwa.org/membership/get-involved/awards/award-details/articleid/90/exemplary-source-water-protection-award.aspx.

**Pilot Project Case Studies of Targeted CWS Program's Current Implementation:**
*Remsen SWP Project* included local coordination of a community planning team consisting of seven landowners, USDA Natural Resources Conservation Service (NRCS), Iowa Dept. of Agriculture and Land Stewardship (IDALS), Pheasants Forever (PF), city officials, and the Iowa Department of Natural Resources (IDNR). The local SWP Team coordinated with IDNR *Targeted SWP Program* to conduct a ground water site investigation to be conducted by the Contaminated Sites Section of IDNR. The nitrate source was identified as localized non-point source. *Resources and funding* for BMP implementation were received from IDALS, landowners, city utilities, and PF. Currently, the nitrate level in the municipal well has reduced from 27 mg/L to 15 mg/L because of this SWP

implementation pilot project. Remsen received the AWWA award in 2010. A presentation on the Remsen SWP Project can be found at: http://awra.org/annual2011/doc/pres/S62-Sham.pdf.

**Additional Targeted CWS Pilot Projects experiencing SWP implementation success through partnerships include:**

- Manchester Targeted Project*: funds received from* USDA of 3.5 Million in Mississippi River Basin Initiative (MRBI) funds for BMP implementation for FFY 2013 through FFY 2016.
- Elliott Targeted Project: *funds received from* IDALS grant, Griswold School land donation, County Conservation Board, County Supervisors, County PF, USDA-Natural Resources Conservation Service (NRCS) & USDA Farm Service Agency (FSA) programs, U.S. Fish & Wildlife, among other funding sources. In addition, for local SWP education an outdoor classroom is also in plan development. Implementation is planned for FFY 2013 thru FFY 2016 for the many BMPs in this project.
- Dunlap Targeted Project: local landowners, school system and city utilities currently working to decrease nitrate application in priority area (as indicated in SWP Plan). SWP initiated in 2011. The SWP implementation appears to be resulting in nitrate levels beginning to decline in city wells.
- Sioux Center Targeted Project: Continues to implement BMPs (cover crops, nutrient management, rotations) on 400 acre priority area. Dordt College and the landowners continue nitrate reduction research at this site for SWP purposes.
- Battle Creek Targeted Project: Addressing a known (verified through DNR Contaminated Sites section) point source through collaborative work with the responsible party and the CWS. Addressing a known point source was instrumental in this pilot project. A video with more information on the Iowa Targeted SWP Program can be found at: http://www.youtube.com/watch?v=X7NGzeLKp4Q.

**Maine**

**Portland Water District's Multiple Tools:**

Portland serves about 200,000 people from Sebago Lake, a recreation destination, prized by boaters, anglers, and outdoor enthusiasts and surrounded by thousands of prized vacation and year-round homes. The Portland Water District maintains a filtration waiver through an aggressive watershed management program which focuses on land use in the watershed. The Water District's efforts have included:

- Purchasing over 2,500 acres of land near its intakes and managing these properties for low intensity recreation, tracking visitors and following up on any violations.
- Conducting a significant educational program for area schools and landowners reaching over 4,000 different adults and numerous school programs.
- Entering into a lease agreement with the Presumpscot Regional Land Trust (PRLT) to allow a regional recreational trail to pass through District watershed land.
- Participating in the Upland Headwaters Alliance, a group that includes five area land trusts, to develop land conservation priorities and acquire funding to increase land conservation efforts in the upper watershed. More Sebago Lake information is available at: http://www.pwd.org/environment/sebago/facts.php

**Maryland**

**Wellhead Protection:**

Maryland Department of the Environment (MDE) has provided funds to several communities and water suppliers for wellhead protection activities and plans. In addition, loans are also available for purchase of properties in wellhead and watershed protection areas. Application packages for grants and loans are available from MDE's Water Supply Program. MDE has worked with a number of local governments to help them implement source water protection measures, and will continue to work with them to ensure the safest possible sources for Maryland's public water systems. For information on a model Wellhead Protection Ordinance, please see the link below.

http://www.mde.state.md.us/programs/Water/Water_Supply/Documents/www.mde.state.md.us/assets/document/WSP-well_ord-2007.pdf

**New York**

**Source Water Protection for Water Systems that Do Not Filter:**

Surface water systems serving New York City and Syracuse have been granted permission not to filter, provided they maintain a comprehensive program of protection in their respective watersheds. As a result, almost every tool and technique of source water protection can be observed in use in these watersheds: land acquisition, septic system maintenance and rehabilitation, upgrades of water treatment plants, stream bank stabilization and restoration, stormwater controls and retrofits, forest management, outreach and education. In addition, more than 90 percent of the major farms in both watersheds participate in a voluntary program to introduce best management practices into every aspect of their operation. New York City is the recipient of the American Water Works Exemplary Source Water Protection award. For more information on the New York City Source Water Protection Program, visit: http://www.nyc.gov/html/dep/html/watershed_protection/index.shtml.

**Voluntary Program for Agricultural Community:**

New York State has the Agriculture Environment Management (AEM) Program, a voluntary program based on the Ontario Environmental Farm Plan Program and Ohio's Whole Farm Planning. The program is administered by county Soil & Water Conservation Districts (SWCDs) and has been very successful in raising farmers' awareness of the environmental impacts of their operation and in helping to introduce appropriate best management practices. The SWCDs are non-regulatory entities that have developed especially good relationships with the farmers in the program, just as the non-regulatory New York Rural Water Association has developed the trust of water system operators. More information on the New York State AEM program can be found at: http://www.nys-soilandwater.org/aem/index.html

**South Dakota**

**Wellhead and Source Water Protection Activities:**

South Dakota Department of Environment and Natural Resources (DENR) cooperates extensively with the South Dakota Association of Rural Water Systems (SDARWS) regarding wellhead and source water protection efforts in South Dakota. The SDARWS works closely with numerous communities across the State to develop source water protection plans and promote protection activities.

Other State source water protection activities include:

- Local government or PWS land purchases in agricultural areas
- County ordinances
- Local regulation of septic systems
- CAFO programs not allowing manure application in areas of Zone A
- Not allowing groundwater discharge permits in wellhead/source water areas
- UST/AST program taking into account SWP areas for spill remediation, UST requirements for double walled tanks and piping near water systems, and AST systems under federal SPCC rules complying with secondary containment requirements
- New PWS well siting conducted to meet specific minimum distances from potential sources of contamination
- Prioritize EPA Class V inspections in SWP areas
- USDA using water quality sensitive areas around PWS wells for inclusion in CRP
- SDDOT using SWP information for locating waste disposal areas.
- Using SWP information to develop groundwater vulnerability mapping
- Trans-Canada routing existing and proposed crude oil pipelines around wellhead/source water Zone A protection areas

For more information, go to: http://denr.sd.gov/des/gw/Sourcewater/Source_Water_Protection.aspx .

**Additional Use of Multiple Protection Tools Case Examples: Florida, Oregon, South Carolina, Washington.**

## 5. Managing and Sharing Information

Effectively managing source water data/information can be the basis for helping to motivate source water protection actions and engaging key partners. To that end, many state source water programs perform one or more functions, including updating data, resolving any data quality issues, establishing secure approaches to data sharing, and making information publicly available.

**Michigan**

**Groundwater Management Tool:**

The Michigan Groundwater Management Tool (MGMT) is a software platform developed by Michigan Department of Environmental Quality (MDEQ) that utilizes spatially compiled groundwater data and allows for the automated analysis of ground water flow. As a tool in ground water modeling, the software allows for the interactive mapping of ground water flow directions based on available data. The MGMT software has the ability to analyze and assess groundwater flow and ultimately delineate wellhead protection areas for community and non-community public water supplies throughout Michigan. MGMT now allows MDEQ to provide delineations at no charge for the smaller community and non-community water systems. This program provides an opportunity for training and redefining substantial implementation for the smaller water systems that had been somewhat limited in what they could do. MDEQ is conducting outreach training to provide owners/operators with provisional delineations, well records, source water assessment/checklists, and continuing education credits. As of October 2012, MDEQ trainings had been attended by 230 operators/owners. As of March 2013, MDEQ had provided provisional delineations for 826 community water supplies and 1,271 non-community, non-transient supplies. This is in addition to the 355 community supplies which had completed the traditional delineations. MDEQ plans on providing provisional delineations to the Upper Peninsula supplies in the near future. The provisional delineations along with an assessment guide will help system owners and operators assess the risks source water and prepare action plans to help reduce risks. More information about this tool and its effectiveness is available through the contact information listed on the Michigan DEQ Fact Sheet.

**Montana**

**Online Tools:**

In addition to making source water delineations and assessments available online, the Montana Department of Environmental Quality (DEQ) Map Query System is a useful online tool to find a specific public water supply (PWS) and display information that exists for the surrounding area. For more information see the link below.
http://www.deq.mt.gov/wqinfo/swp/mappingSystem.mcpx

**Oregon**

**Public Water System Locator Web Tool – National Pollutant Discharge Elimination System (NPDES) Permits:**

Oregon Department of Environmental Quality (DEQ) developed a web-based tool designed to allow agency staff, permittees, and the public to easily identify and obtain contact information for downstream public water system intakes. This was initially designed to assist NPDES permittees as they develop and implement Emergency Notification and Response Plans but is also useful for other applications as well. DEQ's water quality permit staff use the tool to identify beneficial uses. For example, suction dredge miners applying for the new Clean Water Act (CWA) 700-PM general permit are directed to this tool to identify downstream public water supplies. The website also provides a summary of the Source Water Assessment Report for surface water systems and links to PWS data online for contact information of public water suppliers that may be affected by, for example, upstream sewage system overflows or storm-related turbidity problems. The Oregon Web Tool is available at:
http://www.deq.state.or.us/wq/dwp/swrpts.asp.

**Pennsylvania**

**GIS-Based System Source Water Assessments for Small Community Water Systems:**

Penn State University was asked to assist the Source Water Protection Branch in assessing potential contamination threats to small drinking water systems in Pennsylvania. An automated, Geographic Information System (GIS)-based approach was developed to rapidly complete the required analyses. Assessments were completed for over 14,000 wells.

A series of steps were conducted as part of the overall source water assessment process. These steps were automated so that groups of 1,000 or more wells could be assessed in "batch" mode on a dedicated computer. The steps completed in sequence for each assessed well included:

1. Delineation of a wellhead protection area (WHPA) around the well.
2. Identification and quantification of potential threats to drinking water supplies located within the WHPA. This activity was accomplished using existing GIS data sets available with the state.
3. Susceptibility analysis of groundwater sources to contamination. This analysis was based on a methodology previously developed by the Department of Environmental Protection (DEP). In this case, the "overlay and analysis" steps were automated by the use of customized programming (i.e., "scripts") done using Avenue, the programming language used with the ArcView GIS software.
4. For each source (i.e., well) evaluated, a concise report (i.e., MS-Word document) was automatically generated, complete with introductory text, tables and maps.

For more information, see the link below.
http://www.dep/state.pa.us/dep/deputate/watermgt/wc/Subjects/SrceProt/SourceAssessment/default.htm

**Utah**

**Drinking Water Information Online:**

Information about drinking water facilities and source protection zones is available through the Department of Environmental Quality (DEQ) Interactive Map. The Interactive Map is very useful for water systems as they update their inventory of contamination sources. In addition to the drinking water information, the Interactive Map also includes underground storage tanks, CERCLA sites, and many other sites regulated by Utah DEQ.

**West Virginia**

**Providing Technical Assistance and Assessing Information:**

Technical Assistance – The West Virginia Source Water Assessment and Protection (SWAP) team continues to assist water systems by providing maps, databases, best management practice recommendations and inventory technical assistance. The team continues to review proposed new drinking water sources to ensure they will not have a high susceptibility to significant potential contaminant sources. West Virginia contracted with two consulting engineering firms to provide technical expertise and assistance to over 164 interested community water systems for the development of their SWAP programs. The end result of this assistance was to provide an "approvable" local SWAP plan that meets the West Virginia requirements for approval. West Virginia Rural Water Association also continues to provide SWAP technical assistance.

Assessing Information – SWAP program has developed and maintains a password protected web-based geographic information systems (GIS) tool for internal agency(s) and public accessibility to map public water supply wells, their Source Water Protection Areas and other key information. The program uses GIS for preparing and updating maps. The website can be accessed at http://157.182.212.211/DHHR/Default.aspx.

Also, the community source water susceptibility assessment reports have been placed on the website to provide wellhead and source water areas, potential contaminant sources and susceptibility analysis for use by other

utilities, state emergency management and federal agencies. Access to the reports is available at http://www.wvdhhr.org/oehs/eed/swap/search.cfm.
**Additional Managing and Sharing Information Case Examples: Alabama, Arkansas, Connecticut, District of Columbia, Georgia, Minnesota, Nevada, Oklahoma, South Dakota, Tennessee, Texas, Vermont, Washington.**

## 6. State Regulatory Programs

Some states have laws or regulations that require water systems to implement an approved source water protection plan that addresses potential sources of contamination while other states have language in their laws (e.g., drinking water, agriculture, water rights, and others) that address different aspects of source water protection. Many states have been able to use state laws or regulations that were not specifically designed with source water protection in mind, but which can provide broad authorization for certain state source water protection programs.

**Connecticut**
**Statutes and Regulations:**
In 2011, several statutory changes, initiated by the Source Water Protection (SWP) Unit, were passed that: emphasize the importance of maintaining Connecticut's most pristine water bodies for public drinking water use, and strengthen the authority to deny proposed public water supply sources in locations threatened by pollution.

**Source Water Area Inspections:**
The SWP Unit recently worked with a water utility and local health department to issue orders for a private homeowner who's failing septic system was discharging raw sewage near the terminal reservoir of a municipal water supply. The Regulations of Connecticut State Agencies Section 19-13-B102(b) requires water utilities to inspect their watersheds annually to identify risks to their water supplies. For a link to this regulation visit: http://www.ct.gov/dph/lib/dph/agency_regulations/sections/pdfs/title_19._health_and_safety/phc/chapter_ii/19-23._standards_for_quality....pdf.

**Pesticides and Herbicides:**
In 2012, the SWP Unit, Department of Public Health toxicologists, and members of CT Department of Energy and Environmental Protection's Water Quality Program, Pesticide Division executed a Memorandum of Agreement that updated the permitting requirements for introducing aquatic pesticides into waters tributary to drinking water supplies.

For more information, please see the following link for Connecticut's Source Water Protection Unit: http://www.ct.gov/dph/publicdrinkingwater.

**New Jersey**
**Special Protection for Waters with Category 1 Designation:**
The state defines Category One (C-1) waters as waters to be protected from any measurable changes in water quality because of their exceptional ecological, recreational or water supply significance. Developments involving either a ¼-acre increase in impervious surface or a 1-acre disturbance are not allowed within a 300-ft wide buffer area running along each side of a C-1 stream or encircling a C-1 water body such as a lake.

**New York**
**Watershed Rules & Regulations:**
Approximately 300 water systems—both surface and ground water—are covered by so-called Watershed Rules & Regulations (WR&Rs), which can include more than one municipality and are enforceable by the New York State Department of Health (NYSDOH). The watersheds having WR&Rs sometimes have at least one inspector who

responds to residents' environmental concerns and conducts regular pass-through inspections. The water system has to submit an annual report on the state of the watershed to the local health department.

**Oregon**

**Drinking Water and Human Health Criteria – New Water Quality Standards:**

Water quality standards establish goals for Oregon's surface waters such as protecting communities of fish and other organisms that live in the water, sources of drinking water and helping ensure that the fish from Oregon waters are safe to eat. New standards adopted in 2011 include revised human health criteria for 113 toxic pollutants based on a per-capita fish consumption rate of 175 grams per day. With these rule revisions, DEQ also adopted and made effective revisions to the water quality permitting rules addressing intake credits, site-specific background pollutant assessments, and revisions associated with Oregon Departments of Agriculture and Forestry for carrying out each agencies' roles to address nonpoint sources of pollution. The revised standards will result in a reduction in toxic pollutants discharged in Oregon's waterways, leading to greater protection of drinking water sources and safer fish to eat.

**Utah**

**State's Source Water Protection Requirement**

Utah is one of the only states in the U.S. to enact rules requiring source water protection. Starting in 1993, the Drinking Water Source Protection Rule (UAC R309-113, currently numbered as UAC R309-600) was established to require a uniform, statewide program to ensure protection of ground-water sources of drinking water. In 2000, Utah enacted UAC R309-605 "Drinking Water Source Protection for Surface Water Sources." To see the rules go to http://www.drinkingwater.utah.gov/rules.htm.

**Additional State Regulatory Programs Case Examples: Arizona, Arkansas, California, Delaware, Kentucky, North Dakota.**

## State Profiles

This section of the Report contains a 1-2 page profile of each state's SWP program. These state profiles present an overview of the approach to source water protection taken in each state; some summary statistics of the numbers of water systems; information about the numbers of systems for which SWP strategies have been substantially implemented as defined by the state; a description of unique elements of that state's program; and, where available, a brief case example reflecting how that state implements its source water program.

The purposes of these summaries are to give a flavor of each state's approach to protecting sources of drinking water; provide an indication of the diversity of innovative approaches used among the states; and allow for sharing of state best practices. The reader is cautioned against making state-by-state comparisons of programs – particularly with regard to reporting under the national metric used for assessing the progress of state source water protection programs (i.e., the percent of Community Water Systems (CWSs) where risk to public health is minimized through source water protection and the percent of the population served by CWSs where risk to public health is minimized through source water protection). Both metrics rely on a state's definition of "substantial implementation" of state source water protection programs. Thus, each state's profile page should be viewed within its individual context.

ADEM Alabama Department of Environmental Management

**Introduction:**

The Alabama Department of Environmental Management implements the state's Source Water Assessment Program (SWAP). The Source Water Assessment consists of a Source Water Assessment Area (SWAA) delineation, contaminant inventory within the SWAA, and a susceptibility analysis of each contaminant source in the inventory and completion of the public awareness requirements. All public water supply systems using a groundwater source for its drinking water must have a completed an approved SWAP. Upon completion of a SWAP, the public water supply system has the option to complete a voluntary Well Head Plan (WHPP). The WHPP includes formation of a Wellhead Protection Committee, emergency contingency plans, and other measures to protect the water resource.

**Water System Data (2012):**

| | CWS | NTNC | TNC | Ground | Surface |
|---|---|---|---|---|---|
| Number of systems | 530 | 22 | 57 | 372 | 237 |
| Population served | 5,553,524 | 12,815 | 6,596 | 1,623,095 | 3,040,840 |

**AL's Definition of Substantial Implementation of Source Water Protection:**

Community water systems have implemented one or more of the measures proposed in the SWAP.

**Number/Population of CWS systems reported as achieving substantial implementation:**

530 systems (100%) with a population served of 5,553,524 (100%)

**Case Example:** The Alabama Rural Water Association assisted the Leeds Water Works Board (LWWB) with the preparation and completion of a Source Water Protection Plan (SWPP). The LWWB is located in Jefferson County, Alabama and serves a population of approximately 20,000. The utility has four groundwater wells and two springs. The average daily demand at the time of the SWPP was three million gallons per day. The LWWB chose to use public education as their primary venue for protecting their water sources. The LWWB was able to put their SWPP into action when a private company was planning to build a salvage yard near one of the utility's sources. During the permitting and planning phase of the project, the LWWB utilized their SWPP to show that the salvage yard was up-gradient to a water source and that there existed a potential for contamination to that source from any leachate generated at the salvage yard. The developers of the salvage yard decided it was best to find another suitable location.

Alabama Department of Environmental Management
P.O. Box 301463
Montgomery, AL 36130-1463
334-270-5655
http://www.adem.state.al.us/programs/water/drinkingwater.cnt

Alaska Department of Environmental Conservation

# State of Alaska Drinking Water Protection Section

The Drinking Water Protection (DWP) section of Alaska's Department of Environmental Conservation (DEC) Drinking Water Program provides information, tools, resources, guidance, and support for public water systems and others to promote proactive strategies that lead to the protection of public drinking water sources from contamination, as well as to the security of system infrastructure and long-term planning for both manmade and natural disasters. Drinking Water Protection Plans are voluntary in Alaska.

**Water System Data (From the Federal Safe Drinking Water Information System as of 9/30/2011)**

| | CWS | NTNC | TNC | Ground | Surface |
|---|---|---|---|---|---|
| **Number of systems** | **436** | **256** | **858** | **1,285** | **267** |
| **Population Served** | **609,924** | **61,838** | **105,594** | **355,918** | **420,850** |

**State of Alaska's Definitions of Substantial Implementation of Drinking [Source] Water Protection:**
Those community water systems that independently implement at least two drinking [source] water protection strategies. Protection strategies can either be identified by Drinking Water Protection staff or brought to the State's attention by the community or the public water system. These protection strategies do not need to be part of a formal written plan. All of the community water systems meeting this requirement are reported annually as being Substantially Implemented. **OR** The community has an active, enforceable ordinance[1;] active agreement[2;] or active program[3] that explicitly addresses the protection of public drinking water sources. Existing programs must be implemented in order to qualify.

[1] **Regulatory Measures:** Active and enforceable ordinances requiring regulatory protection activities within a drinking water protection area, such as zoning ordinances, subdivision ordinances, site plan review, design standards, and operating standards (Best Management Practices).

[2] **Agreements:** Written agreements between community water system and other entities that directly or indirectly contribute to the protection of public drinking water sources. For example, land-use restrictions.

[3] **Protection Program:** A program that identifies, prioritizes, and establishes activities (a minimum of two) to mitigate the risk of potential contaminant sources within the drinking water protection area. For example, public education, backhaul programs, hazardous waste recycling, purchase of property or rights to develop, water conservation, and community involvement.

**Number/Population of Community Water System reported as achieving Substantial Implementation:** 62 systems (14%) with a population served of 465,689 (79%)

**Case Example:** Drinking Water Protection has recently partnered with the Alaska DEC/Division of Water to use the Alaska Clean Water Actions (ACWA) Grant process to administer a small grant program for community water systems to implement drinking water protection strategies. The ACWA grant program is mainly funded by CWA Sec 319, but the allocation of DWSRF funding has allowed us to expand projects to include the protection of public drinking water sources. In FY11 $12,000 was allocated from DWSRF to the Gulkana Tribal Village Council to assist the Village of Gulkana to decommission up to 18 abandoned wells located in close proximity to their active community well. It is hoped that this project will highlight the importance and need for other Alaskan communities to decommission abandoned wells. Many lessons were learned during this project. The plan is to use the lessons learned from this experience to help the DEC-Drinking Water Program develop policy and procedures necessary to promote the decommissioning of abandoned wells throughout Alaska.

Alaska Dept. Environmental Conservation Div. of Environmental Health, Drinking Water Program
555 Cordova St.Anchorage, AK 99501 (907) 269-7549, http://dec.alaska.gov/eh/dw/DWP/source_water.html

# Arizona Department of Environmental Quality (ADEQ) Source Water Assessment and Protection Program

The Arizona Department of Environmental Quality (ADEQ) utilizes EPA grant funds to support its Source Water Protection (SWP) Program which focuses on six separate source water protection program areas. ADEQ's SWP program areas are defined as: Most Prevalent and Most Threatening Contaminant Risks; Underground Storage Tank (UST)/ Leaking Underground Storage Tank (LUST) Data Evaluations; Non-Petroleum Data Evaluations; School Outreach; GPS Well Project; and Database Query.

In addition to the six program areas, ADEQ undertakes special projects to promote source water protection. Examples of recent projects include: 1) Nogales International WWTP land applied biosolids map; 2) suspect ground water under the direct influence of surface water mapping project showing a 500 foot buffer around public wells along a creek; 3) well map and SWP information for presentation to a Domestic Water Improvement District; 4) Monitoring Assistance Program mapping project for systems and wells by Community and Non-Transient, Non-Community water systems; and 5) a map for a PWS showing active drinking water wells in relation to wastewater treatment plant recharge wells.

**Water System Data (from the Safe Drinking Water Information System)**

| | CWS | NTNC | TNC | Ground | Surface |
|---|---|---|---|---|---|
| **Number of Systems** | **764** | **208** | **579** | **1454** | **54** |
| **Population Served (1000's)** | **6224** | **125** | **118** | **2859** | **3556** |

**State Definition of Substantial Implementation of the Source Water Protection Program**

*"A targeted measure or action that strives to protect a surface water or ground water source from contamination…ADEQ Drinking Water Monitoring & Protection (DWMP) Unit staff determines on a case-by-case basis if the documented actions or the SWP Plan are protective of the source and have begun implementation."*

**As of July 2012, Percent of the population served by community water systems where risk to public health is minimized by source water protection** = 86.6% (5,388,727 / 6,224,395)

**Case Example:** GUDI mapping and investigation project along Oak Creek.
GUDI stands for Groundwater Under the Direct Influence of surface water. Groundwater sources may be *suspect* GUDI if the well is less than 500 feet from surface water. To investigate well distances to surface water, detailed maps were created for twenty-nine (29) public water systems along Oak Creek showing a 500 foot buffer zone around each well. Two larger maps were also created to show the full extent of Oak Creek and the public water systems nearby. Oak Creek stretches 35 miles starting north of Sedona and winding its way south to the Verde River.
Sections of Oak Creek have exceeded water quality standards for E. coli.

**More Information:** Arizona's Source Water Assessment and Protection Program,
Arizona Department of Environmental Quality, Drinking Water Monitoring and Protection Unit
1110 West Washington Street, Mail Code 5415B-2, Phoenix, AZ 8507, (602) 771-4641
http://www.azdeq.gov/environ/water/dw/swap.html

The SWAP established a methodology to perform vulnerability assessments. The vulnerability assessment is a multi-step process consisting of source location, delineation of source water assessment areas, potential contaminant identification, and a susceptibility analysis. Within the delineated assessment areas, Potential Sources of Contamination (PSOC) are identified, categorized according to relative public health significance, proximity to the drinking water source intake, and mapped. The information/data is pertinent to promoting drinking water source protection programs.

Arkansas Department of Health (ADH) provides assistance to public water systems as well as other agencies and organizations in development of voluntary wellhead protection and/or source water protection plans. Emphasis is on the management phase of the programs, often resulting in passage of local ordinances or resolutions.

**Water System Data (Safe Drinking Water Information System 9/30/2012)**

| | CWS | NTCWS | TNCWS | Ground | Surface |
|---|---|---|---|---|---|
| Number of systems | 707 | 34 | 354 | 677 | 418 |
| Population Served (1000's) | 2,712 | 9 | 21 | 882 | 1,861 |

**State Definition of Substantial Implementation of the Source Water Protection Program**

For Arkansas, Substantial Implementation is defined as any Community Water System (CWS) that has a SWP program in place that includes a management team, a delineation (SWAP or WHPP delineation), a potential sources of contamination ( PSOC) inventory, and one of the following control measures/management strategies: (1) SWP/WHPP ordinance/resolution, or (2) any two of the following: SWP Emergency/Contingency plan, public outreach program, drinking water protection signs, and/or any other control measure/management strategy deemed acceptable by the state.

**Number/Population of Community Water Systems reported as achieving Substantial Implementation (SDWIS 9/30/2012)**

356 systems (50%) with a population served of 1,720,065 (63%)

**Case Example – Source Water Protection Memorandum of Agreement (MOA) between the Arkansas Department of Health (ADH) and the Arkansas Department of Environmental Quality (ADEQ)**

The MOA is the first formal agreement between the State's SDWA agency and the State's CWA agency in efforts to better utilize data developed for the SWAP program and bridge program boundaries to protect public drinking water supplies. The MOA established coordination efforts to protect the state's drinking water resources by:

Data Sharing:

1) ADH will provide ADEQ with GIS layers depicting public drinking water sources and their source water assessment areas on a quarterly basis.
2) ADEQ will provide ADH with locations of registered UST and above-ground storage tank (AST) systems, systems specifics, reported leaking tank sites and cleanup projects.

Targeted Actions:

1) ADEQ will prioritize inspections of regulated UST facilities in designated source water protection areas and will take enforcement actions as appropriate to ensure the protection of such areas.
2) ADEQ will continue to target impacted source waters or source waters with the greatest potential for impact from leaking USTs or ASTs for cleanup efforts.

The ADH also has an unofficial communication provision with the Arkansas Highway and Transportation Department (AHTD) for sharing of GIS layers depicting public drinking water sources and their source water assessment areas. The agreement includes the following:

1) AHTD screens each highway construction project and determines if the project is located within a source water assessment area.
2) When a construction project is located within a source water assessment area the ADH and public water supplier are notified and are requested to provide recommendations in order to mitigate any potential impacts.

For more information on the Arkansas Source Water Assessment & Protection Program see the link below.
http://www.healthy.arkansas.gov/programsServices/environmentalHealth/Engineering/sourceWaterProtection/

Arkansas Department of Health, Engineering Section
4815 West Markham, Slot 37
Little Rock, AR 72205-3867
Phone 501 661-2623
Safewater@arkansas.gov

# State of California Department of Public Health (CDPH) Drinking Water Source Assessment and Protection (DWSAP) Program

A major goal of the California Department of Public Health (CDPH) Drinking Water Source Assessment and Protection (DWSAP) Program has been to encourage water systems and others to initiate protection of drinking water sources. Since some drinking water wells in California are contaminated with chemicals due to past human activities, including the contamination of several major groundwater basins that supply drinking water to millions of people and are on USEPA's Superfund list, water systems realize the difficulty and economic costs involved with solving the problem and the necessity for source water protection to maintain existing water quality. For water systems potentially impacted by contaminants from unregulated sources, California continues to work with those water suppliers to implement additional steps, as required, to achieve substantial implementation of source water protection.

**Water System Data (from the Safe Drinking Water Information System (SDWIS) database), 2012**

| | CWS | NTNC | TNC | Ground | Surface |
|---|---|---|---|---|---|
| **Number of Systems** | **2,955** | **1,484** | **3,099** | **6,332** | **1,162** |
| **Population Served (1000's)** | **41,340** | **363** | **848** | **7,741** | **34,807** |

**State Definition of Substantial Implementation of the Source Water Protection Program**

*"Substantial implementation of source water protection is being achieved through a variety of existing state programs. California has recognized the need for protection of drinking water sources through various laws, regulations and standards. These include water well standards, underground storage tank requirements, pesticide use regulations, water permit conditions, surface water sanitary surveys and storm water runoff requirements. In addition, California has been protecting drinking water through routine inspections of these sources and recommending or requiring protective measures based on the results of these inspections"*

**Case Examples:**

The California Department of Public Health completed a project working with the State Water Resources Control Board, University of California at Davis, and environmental justice stakeholders to develop a report as mandated by Senate Bill SBX 2-1 to identify and quantify sources of nitrate-groundwater pollution in the Tulare Lake Basin and Salinas Valley. The effort includes identifying the methods and costs to reduce, prevent, and treat nitrate contamination. More information for this project can be found at:
http://www.waterboards.ca.gov/water_issues/programs/nitrate_project/index.shtml

CDPH has completed its consultation with the State Water Resources Control Board on a report developed pursuant to Assembly Bill AB 2222. This Assembly Bill project required the State Water Resources Control Board and CDPH to submit to the Legislature a report that identifies communities that rely on contaminated groundwater as a primary source of drinking water, identifies the groundwater sources for the communities and the principal contaminants and other constituents of concern, and identifies potential solutions and funding sources to clean up or treat groundwater. More information for this project can be found at:
http://www.swrcb.ca.gov/water_issues/programs/gama/ab2222/index.shtml

CDPH is a member of the Central Valley Drinking Water Policy Work Group. The working group is continuing its efforts to further develop a drinking water policy to reduce threats to the Sacramento and San Joaquin River watersheds and intakes that serve 23 million people within California's Central Valley. More information for this project can be found at:
http://www.swrcb.ca.gov/rwqcb5/water_issues/drinking_water_policy/

**CDPH Contact Information:**

Mark Bartson, CA Department of Public Health, Chief, Technical Operations Section (916) 449-5622, Mark.Bartson@cdph.ca.gov, http://www.cdph.ca.gov/certlic/drinkingwater/Pages/DWSAP.aspx

# Colorado Source Water Assessment and Protection Program

Colorado completed source water assessment reports for over 1,700 public water systems in 2004 and is working on revisions. All reports are posted on the SWAP website.
The Colorado SWAP project is transitioning from the assessment phase to the protection planning phase. The program is conducting regional source water protection planning throughout the state. The meetings are focused on educating public water systems, community members and stakeholders on the protection planning process and technical and financial resources available through the SWAP program. Several public water systems throughout the state are already conducting protection planning activities with technical assistance from the State and the Colorado Rural Water Association. In addition to technical assistance, the Division provides grant funding to support the protection planning phase.
In 2007, Colorado developed the Integrated Source Water Assessment and Protection (ISWAP) project, developed and reviewed by a Citizen's Advisory Group. ISWAP incorporates elements of the 1994 Colorado Wellhead Protection program plan and the 2000 Colorado Source Water Assessment and Protection program plan. It is available at: http://www.cdphe.state.co.us/wq/sw/pdfs/ISWAP.pdf

**Water System Data (from the Federal Safe Drinking Water Information System as of 9/30/2011)**

| | CWS | NTNCWS | TNCWS | Ground | Surface |
|---|---|---|---|---|---|
| **Number of Systems** | **877** | **178** | **998** | **1,509** | **544** |
| **Population Served (1,000's)** | **5,386** | **76** | **248** | **714** | **4,997** |

**State Definition of Substantial Implementation of the Source Water Protection Program**
The implementation phase of a source water protection strategy in Colorado consists of the execution of the highest priority management activities contained in a comprehensive local source water assessment and protection plan, and continual monitoring and evaluation of the effectiveness of the implemented protection actions.

**Number/Population of Community Water Systems reported as achieving Substantial Implementation**
44 systems (5%) with a population served of 548,824 (10 %)

**Case Example – Source Water Protection MOU**
Colorado is a headwaters state. Nearly 90% of National Forest lands in Colorado are located in regions that contribute source water to public drinking water supplies. In 2009, the Colorado Department of Public Health and Environment (CDPHE) and the Rocky Mountain Region of the U.S. Forest Service (Forest Service) signed a Memorandum of Understanding (MOU) addressing management and protection of Source Water Areas on National Forest System (NFS) lands in Colorado. The MOU established a framework for CDPHE and the Forest Service to work together in a cooperative manner on issues related to Source Water Protection on NFS lands in Colorado. The MOU recognizes locally-developed source water protection plan, outlines a strategy for sharing data, identifies municipal supply watersheds, identifies priority areas for wildfire treatment, and promotes awareness and education on the importance of safe drinking water sources. Link to MOU: http://www.colorado.gov/cs/Satellite/CDPHE-WQ/CBON/1251596793639

**Case Example – Protection Planning Grant Program**
Funding for protection planning is available from the State Drinking Water Revolving Fund (SDWRF) set-asides. The SDWRF set-asides enable the SWAP program to provide financial support for protection plan development.

These set-asides allow the state to utilize a percentage of its capitalization grant to assist in the development of local drinking water protection initiatives and other State projects. The grant funds are awarded for two types of projects: Pilot Planning Projects and Development and Implementation Projects.

Pilot Planning Project Grants support exemplary and comprehensive source water protection plans. Once completed, these pilot projects serve as examples to others interested in developing plans to protect their drinking water sources. These grants can range up to $50,000 and require a one to one financial match (cash or in-kind match). The Pilot Planning grants also require the protection planning entity to evaluate the expenses related to replacing the current water source (i.e. acquiring water rights, restructuring water supply system, economic impacts, etc.). The additional cost analysis provides an estimated value of water resources to further understand the importance and significance of source water protection planning.

Development and Implementation Grants are awarded to public water systems and representative stakeholders committed to developing a source water protection plan. Grants up to $5,000 are awarded for plan development and for implementation. A one to one financial match (cash or in-kind) is required. More information on the grant program can be found at http://www.colorado.gov/cs/Satellite?c=Page&childpagename=CDPHE-WQ%2FCBONLayout&cid=1251597403016&pagename=CBONWrapper.

**Contact Information:**
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# Connecticut Department of Public Health
# Drinking Water Section
# Source Water Protection Unit

The Connecticut Department of Public Health Drinking Water Section created a dedicated functional unit to implement policies and enforce statutes and regulations pertaining specifically to the protection of the sources of supply for public drinking water. The Source Water Protection Unit (SWP) is responsible for the purity and adequacy of Connecticut's approximately 2,593 surface and ground water drinking water supply sources.

The SWP Unit maintains a *Strategic Plan for the Implementation of Drinking Water Source Protection in Connecticut*. The program elements coordinate, manage, and regulate source protection through the proactive enhancement and oversight of existing source protection laws and regulations, integration with water supply planning, education of local land use officials, and involvement with stakeholders on a continuous basis. This Strategic Plan has two main objectives:

1. Revise existing public health laws, with an emphasis on education and training, involvement of stakeholders and creation of linkages to all relevant programs in order to effectively implement the comprehensive drinking water source protection strategic work plan;
2. Maintain minimized risk to public health for 100 percent of source water areas for community water systems (both surface and groundwater) by substantial implementation of the source water protection actions listed in the Strategic Plan, as well as full application of the federal Ground Water Rule and other laws that are in place to prevent contamination and protect water quality and therefore public health.

**Water System Data (as of September, 2012):**

| Type of Water System | Community | Nontransient Noncommunity | Transient Noncommunity | Groundwater | Surface Water |
|---|---|---|---|---|---|
| Number of Systems | 556 | 582 | 1,454 | 2,513 | 79 |
| Population Served | 2,714,190 | 113,320 | 59,373 | 429,705 | 2,447,846 |

**State Definition of Substantial Implementation of the Source Water Protection Program:**
The SWP Unit considers substantial implementation as being achieved when all public water systems are in compliance with the objectives in the Strategic Plan. This includes activities and tasks such as: implementation of continually revised statutes and regulations for source water protection including the provisions of the federal Groundwater Rule; thorough review and potential permits and approval of all proposed sources of water supply and all sale and changes to water company owned land and permits for monitored recreational activities on water company land to ensure that only the safest water is made available for public consumption; coordination of the process of conducting annual watershed inspections and annual submission of Watershed Survey Reports; active and committed involvement with the improvement of the Geographical Information System (GIS) application and database which is critical for adequate source assessment and protection; continually working with local, regional and state partnerships on Environmental Impact Review promoting the usage and understanding of source water protection concepts and best management practices to enhance drinking water source protection; working with many diverse groups to enhance drinking water source protection and provide useful educational materials; and working to develop and utilize consistent policies for the use of pesticides and herbicides in public drinking water sources of supply.

**Case Examples:**

- Statutes and Regulations: In 2011, several statutory changes, initiated by the SWP Unit, were passed that emphasize the importance of maintaining Connecticut's most pristine water bodies for public drinking water

use and strengthen the authority to deny proposed public water supply sources in locations threatened by pollution.

- Source Water Area Inspections: The SWP Unit recently worked with a water utility and local health department to issue orders for a private homeowner who's failing septic system was discharging raw sewage near the terminal reservoir of a municipal water supply. The Regulations of Connecticut State Agencies Section 19-13-B102(b) requires water utilities to inspect their watersheds annually to identify risks to their water supplies.

- Stakeholder Workshops Lead to Source Water Protection Activities: The SWP Unit, along with the EPA and US Geological Survey held a stakeholder workshop in October, 2010 to address local source water protection issues. Topics included: cyanotoxins, low impact development and new techniques for water quality protection and management.
  The SWP Unit has begun an effort to disseminate information on the Drinking Water Section website regarding drinking water supply impacts due to Cyanobacteria, Harmful Algal Blooms (HAB's) and invasive freshwater alga. The SWP Unit will participate in a watershed inspector training that is being held in April 2013 to assist personnel of water utilities who annually inspect properties within drinking water watersheds for risks to public water supplies.

- Pesticides and Herbicides: In 2012, the SWP Unit, Department of Public Health toxicologists, and members of CT Department of Energy and Environmental Protection's Water Quality Program, Pesticide Division executed a Memorandum of Agreement that updated the permitting requirements for introducing aquatic pesticides into waters tributary to drinking water supplies.

- Water Utility Partnership: The SWP Unit meets bimonthly with the Connecticut section of the American Water Works Association, Source Water Protection Committee to discuss topics of mutual interest ranging from federal regulations, state statute revisions, local issues. This committee works to develop guidance documents for the annual watershed inspections required by DPH; educational materials for residences and businesses located in public water supply watersheds and sharing information on training events. The SWP Unit also collaborates on a regional and national level (e.g. New England Interstate Water Pollution Control Commission, Ground Water Protection Council, etc.) to ensure that the most effective policies and laws are enacted in Connecticut.

- State Policies: The SWP Unit reviewed and offered comments to the State's Office of Policy and Management on the draft State of Connecticut Conservation and Development Policies Plan 2013-2018. One of the key policy recommendations to protect sources of public drinking water that was included in the draft is "utilize an integrated watershed management approach to ensure that high quality existing and potential sources of public drinking water are maintained for human consumption." Projects receiving over $200,000 in state funding must be consistent with the policies in the C and D Plan.

For more information, please see the link below for Connecticut's Source Water Protection Unit:
http://www.ct.gov/dph/publicdrinkingwater.

Department of Public Health
410 Capitol Avenue – MS #51 WAT
P.O. Box 340308
Hartford, CT 06134
(860) 509-7333


The **Delaware Department of Natural Resources and Environmental Control (DNREC)** has the lead role in the development and implementation of the Delaware SWAPP. The Delaware Division of Public Health and the Institute for Public Administration Water Resources Agency at the University of Delaware, closely supports its work. A SWAPP Citizen and Technical Advisory Committee (CTAC) was formed at the start of this program in 1998, continues to assist in developing and implementing Delaware's SWAPP, and ensures public involvement.

**FY2012 Water System Data (from the Federal Safe Drinking Water Information System)**

| | CWS | NTCWS | TNCWS | Ground | Surface |
|---|---|---|---|---|---|
| Number of systems | 214 | 83 | 198 | 488 | 7 |
| Population Served (1000's) | 899 | 22 | 53 | 488 | 487 |

**State Definition of Substantial Implementation of the Source Water Protection Program**
Strategies substantially implemented – These strategies refer to **"enforceable" protection measures** or standards adopted at the local or state level that require protection of water quality or quantity in source water areas (wellhead and watershed). Examples would be local ordinances with SWP regulations, county-wide ordinances with SWP regulations, and the DNREC regulation regarding secondary confinement for Underground Storage Tanks (UST).

**Number/Population of Community Water Systems reported as achieving Substantial Implementation in 2012**
207 systems (95%) with a population served of 842,265 (94%)

**Case Example – Source Water Protection Guidance Manual for the Local Governments of Delaware "A Toolbox for the Protection of Public Drinking Water Supplies in Delaware"**
http://www.wr.udel.edu/swaphome/Publications/SWPguidancemanual.html
The State of Delaware Source Water Protection Law of 2001 (7 Del. C. 6081, 6082, 6083) requires local governments with year-round populations of 2,000 or greater to implement measures to protect the quality and quantity of public water supplies within delineated surface water, wellhead, and ground-water recharge areas by 2007. The purpose of this manual is:

1) To provide local governments with a concise listing of protection measures meant to protect drinking water and to comply with the legislation,
2) To encourage jurisdictions with year-round populations of less than 2,000 to adopt measures to protect their sources of public drinking water.

This manual is an important component that provides basic information on how local governments might tailor their water protection efforts.

For more information see link below.
http://www.wr.udel.edu/swaphome/index.html

Delaware's Source Water Assessment and Protection Program (SWAPP)
Ground-Water Protection Branch|Water Supply Section |Division of Water Resources
Department of Natural Resources and Environmental Control
89 Kings Highway|Dover, Delaware 19901
phone 302 739 9945|fax 302 739 2296

# District of Columbia Source Water Assessment Program

**Potomac River Basin Drinking Water Source Protection Partnership**

Protection and restoration of water bodies for drinking water supply require significant management practices. The need for protection of source waters has been identified through the source water assessments, as promulgated by the 1996 Safe Drinking Water Act Amendments. Drinking water in the District of Columbia comes from the Potomac River, whose watershed encompasses 14,670 square miles and stretches across parts of four states (Maryland, Pennsylvania, Virginia, and West Virginia) as well as the District of Columbia. In April 2002 the Interstate Commission on the Potomac River Basin (ICPRB) conducted a Source Water Assessment of the Potomac River watershed under contract to the District of Columbia government. Then in 2004, in order to address drinking water quality concerns arising in source water areas, drinking water utilities and their governmental counterparts worked together to create the Potomac River Basin Drinking Water Source Protection Partnership (DWSPP).

DWSPP is a voluntary association of water suppliers and government agencies focused on protecting drinking water sources in the Potomac River basin. This coalition of water utilities and management/regulatory agencies enables a comprehensive approach to protecting raw water supplies in the basin. Through workgroups and active discussion at meetings, the Partnership identifies strategies for carrying forward source water protection efforts, as recommended by source water assessments that were prepared throughout the Potomac River basin. The Partnership now has 20 member organizations as well as numerous partner agencies, all focused on protecting the Potomac as a viable source of drinking water. Its unique and complementary technical, operational, and regulatory expertise helps to identify challenges, assess priorities and address issues. The Partnership has formed several workgroups to address issues in the basin including emerging contaminants of concern, disinfection by-products, urban contaminants and agriculture/pathogens.

**FY2012 Water System Data (from the Federal Safe Drinking Water Information System)**

| | CWS | NTCWS | TNCWS | Ground | Surface |
|---|---|---|---|---|---|
| Number of DC systems | 5 | 1 | 0 | 0 | 6 |
| Population Served (1000's) | 646 | 0.250 | 0 | 0 | 646 |

**State Definition of Substantial Implementation of the Source Water Protection Program**

Substantially implemented – The Partnership is not currently involved in implementation. The focus has been education, outreach and research on issues affecting drinking water quality in the basin.

**Number/Population of Community Water Systems reported as achieving Substantial Implementation:** 0 (0)

**Case Example: Building Early Warning Response into Source Water Protection**

The Potomac Drinking Water Source Protection Partnership's Early Warning/Emergency Response Workgroup, with assistance of EPA Region 3 and the U.S. Department of Transportation conducted a two-day emergency response training and spill response exercise with representatives from drinking water utilities, state and local emergency response departments, and variety of other active state, regional and federal agencies. The Colonial Pipeline Company, an interstate common carrier of petroleum products was also an active participant.

The goal was to help agencies better prepare for a contaminant spill that affects the sources of drinking water in the Washington, D.C. metropolitan area. Spill response training was conducted on September 16, 2008 and a table-top exercise took place on October 21, 2008. These sessions provided emergency response training, enhanced coordination and communication between all potential responders, improved the understanding of roles and responsibilities, and allowed for discussion of immediate steps to prepare for a future water system-specific

emergency incident. The training session provided an overview of the Incident Command System (ICS) framework for emergency response, provided participants with an opportunity to review local and regional emergency response plans related to drinking water, and ended with an exercise to develop an ICS Command Structure for a Potomac spill response. A tabletop exercise addressed a hypothetical oil spill from a pipeline into the Potomac River upstream of the major water supply intakes for the Washington, D.C. metropolitan area. It consisted of a series of facilitated discussions on the following topics:

- Communications
- Oil tracking and forecasting via simulation models or visual observation
- Oil containment measures and options for protecting water supply intakes
- Potential operational changes at intakes and water treatment plants by water utilities
- Emergency water restrictions
- Media and public relations

Many organizations contributed time and resources to help make the event a success by assisting in planning, donating resources, and by preparing presentations. The training and spill exercise in 2008 were helpful learning tools for DWSPP and the After Action Report completed at the end of the training has helped the Partnership build the capacity to respond to a spill in the basin and to ensure source water protection issues are taken into consideration during such an event. Since the event, DWSPP has continued to focus on strengthening communications and building relationships with regional emergency response agencies and with possible contamination threats upstream.

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## *Florida Department of Environmental Protection*

Florida contains abundant water resources, with most of the state receiving more than 50 inches of rain each year. While this rainfall is the source of water for extensive ground and surface water supplies, Florida's rapid population growth has resulted in both a very high demand for potable water and a variety of potential contaminant sources that could impact the State's water resources. Pollution prevention has long been recognized by Florida as the most effective approach to protect the water resources of the State and to ensure a safe supply of public drinking water. The Florida Department of Environmental Protection (FDEP) is the state agency responsible for water quality resource protection, including wellhead and source water protection. FDEP implements comprehensive surface water and ground water quality protection programs establishing surface water and ground water quality standards, classifications, and permitting criteria.

**Water System Data (2012):**

| | CWS | NTNC | TNC | Ground | Surface |
|---|---|---|---|---|---|
| Number of systems | 1,537 | 819 | 2,900 | 5,239 | 17 |
| Population served | 18,629,027 | 183,934 | 247,451 | 17,047,255 | 2,013,157 |

**FL's Definition of Substantial Implementation of Source Water Protection:**
Substantial implementation is occurring when the State determines for each Community Water System (and related population), strategic protection actions have been or are being taken to appropriately address state-identified significant sources of contamination, taking into consideration the sensitivity of the source water to contamination.

**Number/Population of CWS systems reported as achieving substantial implementation:**
1,166 systems (76.6%) with a population served of 11,476,094 (70%)

**Case Example:**
In Florida, a comprehensive watershed approach is used to provide source water protection for rural communities and agricultural areas. The Florida Rural Water Association and the Florida Source Water Protection Program work with communities and other interested parties to develop a source water protection plan. Stakeholders, including city officials, councils, utilities, agricultural and business interests and concerned citizens, identify potential source water threats within a watershed and develop preventive and educational measures to protect source water within the watershed. The watershed approach allows greater utility of resources and efforts while raising public awareness over a large region. This approach can also provide a greater degree of protection for individual systems where protection areas and potential sources may overlap. In 2010, 11 "watershed" source water protection plans were developed for various areas throughout northern and central Florida.

For more information, contact:
Florida Department of Environmental Protection
2600 Blair Stone Rd., Mail Stop 3580
Tallahassee, FL 32399-2400 850-245-8644 http://www.dep.state.fl.us/swapp


The Georgia Environmental Protection Division (EPD) is the primary source for implementing the Source Water Protection Program (SWPP) and Georgia's Wellhead Protection Program (WHP). Funding for the program comes from EPA's GW 106 grant. Georgia's WHP/SWP programs help protect ground water sources for public water supply systems. Wells and springs receive an appropriate protection area depending on the aquifer type, well construction, and/or pumping rate of the source. An inventory of potential pollution sources located within the wellhead protection area is conducted to alert each water system to possible pollution sources located within the management zone(s) of each of their sources. The WHP program also assists local governments and authorities with developing ordinances and contingency plans to further protect their ground water source(s). In addition, the Georgia Rural Water Association assists local governments with developing community wellhead protection ordinances. Rules for wellhead protection (391-3-5-.40) and source water protection (391-3-5-.42) are included as part of the Georgia Rules for Safe Drinking Water.

| **Water System Data (2012):** | CWS | NTNC | TNC | Ground | Surface |
|---|---|---|---|---|---|
| Number of systems | 1,778 | 186 | 460 | 2,214 | 239 |
| Population served | 8,541,338 | 63,558 | 76,640 | 1,785,878 | 6,896,270 |

**Georgia's Definition of Substantial Implementation of Source Water Protection:**
**Ground Water**: A source water protection plan or wellhead protection plan that has been enhanced by means of working with the community to implement protection recommendations either through the adoption of an ordinance, development of a contingency plan, or has received assistance with implementing best management practices from the Georgia Rural Water Association.
**Surface Water**: Watershed protection plan that has been enhanced by working with the community to implement protection recommendations and best management practices.

**Number/Population of CWS systems reported as achieving substantial implementation:**
429 systems (24%) with a population served of 1,840,546 (22%)

**Case Example: City of Colquitt (Miller County) – identifying the Wellhead Protection Area:**
The City of Colquitt is located in the Dougherty Plain of southwest Georgia. The Dougherty Plain is a northeast- and southwest-oriented, flat plain bound on the northeast by the Fall Line Hills and to the southwest by the Tifton Uplands. Surface soils are sand to clay in composition, ranging from well drained to poorly drained. This soil is composed of a mixture of residuum from dissolution of limestone and imported fine sands through fluvial transport. Few surface water streams dissect the area, since there is little runoff due to low-grade porous sands. The residuum in the Colquitt area varies in thickness between 50-75 feet and overlies the Ocala limestone. The Ocala limestone is characterized by having a primary and relatively high secondary porosity. Solution channels are common as well as collapse of these structures, resulting in the large number of sinkholes that occur in the vicinity. Large yielding wells can be found signifying the relative abundance and rapid flow characteristics of this aquifer.
The management zone relies more heavily on fractures traces and soil draining properties than calculated data. Since the aquifer is highly transmissive and highly heterogeneous, numerical calculations may greatly underestimate flow velocity and direction. The outer-management zone is therefore much wider and extends further up-gradient than calculated. The down-gradient extent includes surface water divides in the city to the southwest. To the northwest and southeast, fracture traces are included that may direct flow toward the well. To the northeast and east, the up-gradient extent goes to areas that have mappable fracture traces and well draining soils. In addition to an outer-management zone, an additional zone of protection is needed in the Colquitt area. A number of private wells are located within the outer-management zone that potentially allows direct and rapid connection to the aquifer. These areas and their respective drainage basins are included in a "zone of high vulnerability."

Georgia Environmental Protection Division, 404-656-5660, askepd@gaepd.org

2 Martin Luther King Jr. Dr., Suite 1362 East, Atlanta, GA 30334-9000


# State of Hawaii Department of Health (DOH) Source Water Assessment and Protection (SWAP) Program

State of Hawaii Department of Health's (DOH's) Source Water Assessment and Protection (SWAP) Program focuses primarily on source water protection planning and implementation activities. DOH conducts Source Water Assessments (SWA) and implements protection measures for new and proposed drinking water (DW) sources, in accordance with state guidelines. DOH also invests in Wellhead Protection (WHP) training for staff, including developing and conducting WHP trainings for Public Water System (PWS) personnel, community groups, the public, consultants, and government agencies. DOH also provides a WHP financial assistance program to assist PWS fund protection planning and implementation activities. DOH is committed to keeping the public current on SWAP activities and progress via regular newsletters, public meetings, and community events.

**Water System Data (from the Safe Drinking Water Information System, 2012)**

| | CWS | NTNC | TNC | Ground | Surface |
|---|---|---|---|---|---|
| **Number of Systems** | **110** | **17** | **2** | **117** | **12** |
| **Population Served (1000's)** | **1460.2** | **11.5** | **0.0** | **1307.0** | **165.1** |

**State Definition of Substantial Implementation of the Source Water Protection Program:**
*"A Source Water Protection Plan that has a significant number of implemented activities to protect the source water from contamination (such as activities implemented to cover the most prevalent potentially contaminating activities (PCAs) or land-use/planning controls over the delineated area)."*

**As of July 2012, Percent of the population served by community water systems where risk to public health is minimized by source water protection = 10% (127,924 / 1,317,297)**

**Case Example:**
The DOH's Source Water Assessment and Protection (SWAP) Program has developed a Wellhead Protection – Financial Assistance Program (WHP-FAP) to assist PWS planning and implement source water protection. DOH is currently working with the County Water Departments and private Public Water Systems (PWSs) on WHP-FAP Contracts. To date, the County of Maui, Department of Water Supply has developed draft protection strategies for the islands of Maui, Molokai, and Lanai, developed well siting criteria, worked with the County Planning Department to incorporate SWAP Areas into its review process, and has produced media ads related to water protection. Through December 2012, DOH issued almost $1.9 million in WHP development and/or implementation contracts to the County water departments, University of Hawaii, and a few private PWSs for protection planning activities such as hazardous waste remediation of a water shaft located near a drinking water well, remediation and upgrading of on-site disposal systems (cesspools and septic systems) located near drinking water sources, and developing and implementing Project Water Education for Teachers (WET) throughout the State of Hawaii.

**More Information:**
Safe Drinking Water Branch, Hawaii Department of Health, 919 Ala Moana Boulevard, Honolulu, HI 96814
(808) 586-4258; http://hawaii.gov/health/environmental/water/sdwb/swap/swap.html

## Idaho State Source Water Protection Program

The goal of Idaho's Source Water Protection (SWP) Program is to ensure clean and safe drinking water sources for Idaho citizens. The Idaho Department of Environmental Quality's (DEQ) SWP Program focuses on three major components of protection: Assessment, Planning, and Implementation.

DEQ completed source water assessments (SWA) on all recognized public water sources by 2003, and continues to complete assessments for new public water sources, as well as update assessments as new information is available. DEQ has developed an online website where SWA data can be viewed by public water systems (PWS) and the public in an interactive format (http://www.deq.idaho.gov/water/swaOnline/). Local communities can use the information in the assessment to address problems and future threats to their drinking water sources. DEQ helps PWS's and communities develop protection plans and incorporate source water protection into various planning efforts including: city and county comprehensive plans, regional protection plans (including Ground Water Quality Improvement Plans, County Drinking Water Protection Plans, and Total Maximum Daily Load Implementation Plans). A PWS can gain official recognition for its protection plan by pursuing state certification through DEQ. DEQ also provides workshops on source water protection and assists communities with implementation efforts by providing technical assistance, grants, educational materials, and other resources.

**Water System Data (From the Federal Safe Drinking Water Information System as of 9/30/2011)**

| | CWS | NTNC | TNC | Ground | Surface |
|---|---|---|---|---|---|
| Number of systems | 745 | 225 | 985 | 1,871 | 84 |
| Population Served | 1,100,438 | 52,366 | 99,586 | 987,873 | 264,516 |

**State Definition of Substantial Implementation of the Source Water Protection Program:**
Source water protection in Idaho is a voluntary process and includes various mechanisms to meet protection and substantial implementation goals. Idaho defines initial protection as the development of a protection plan or program at the regional, local, or system level. Source water protection areas can include individual sources or groups of multiple sources (i.e. wells in a single aquifer, wells in a cluster, intakes in the same watershed, and systems within a jurisdictional boundary). Each source protected by the implementation of a plan, program or DEQ approved SWP activity, would be considered to be implementing source water protection.

**Number/Population of Community Water systems reported as achieving Substantial Implementation:**
In 2010, 223 systems (30%) with a population served of 389,526 (35%) achieved substantial implementation.

**Case Examples:**
*Outreach and Training:* DEQ's SWP program has developed a variety of education and outreach materials and provides SWP information to communities through public service announcements, presentations, outreach, and training. For example, in 2011 DEQ presented seven full-day workshops throughout the state on ground water fundamentals. The workshops, which targeted local government officials and public water systems operators, provided information on basic hydrogeologic concepts, ground water flow, well construction and source water protection. Over 230 people attended the workshops.

*SWP Grant Program:* DEQ established a SWP grant program in 2008 and awarded approximately $200,000 in funding in 2011. An average of 12 -14 local and regional projects are selected each year for funding. For example, in 2010 DEQ provided funding to assist Bannock County with the development of a Ground Water Resource Protection Overlay District to protect critical ground water and drinking water sources in the county. A Citizens Advisory Committee was established to review recommendations of the technical committee, provide advice to the County, and provide public outreach. DEQ assisted with several public meetings to educate the public on the recommendations of the Citizens Advisory Committee to protect ground water in the county. More information on the SWP grant program and a list of funded projects is available at www.deq.idaho.gov/SWPgrant.

Contact: Amy Williams, Source Water Program Coordinator, Idaho Department of Environmental Quality
1410 N. Hilton, Boise, Idaho 83706, (208) 373-0502, Amy.williams@deq.idaho.gov, http://www.deq.idaho.gov

## Illinois Source Water Protection Program

The Illinois Source Water Protection Program is jointly managed by the Illinois Environmental Protection Agency (Illinois EPA), the lead agency and responsible for community water systems (CWS), and the Illinois Department of Public Health, which manages SWP for non-community water systems. The program draws its authority from the Illinois Groundwater Protection Act (P.A. 85-0863, 1987), which responds to the need to manage groundwater quality by emphasizing a prevention-oriented process, see: http://www.epa.state.il.us/water/groundwater/. New permit applications requirements for CWS wells are also being implemented to enhance wellhead protection (WHP), see: http://www.epa.state.il.us/water/forms.html#permits-drinking-water. For groundwater systems, the IEPA has conditioned receiving Safe Drinking Water Act vulnerability monitoring waivers ~~to~~ on a requirement to implement WHP, approving approximately 700 out of 1,754 total CWS. Surface water protection occurs via local efforts and the IEPA's Watershed Section in response to TMDL's and by implementation of best management practices under Section 319 of the Clean Water Act.

**June 2012 Water System Data**

| | CWS | NTNCWS | TNCWS | Ground | Surface |
|---|---|---|---|---|---|
| **Number of Systems** | 1,745 | 421 | 3,417 | 4,794 | 789 |
| **Population Served** | 12,139,110 | 142,623 | 343,470 | 3,638,046 | 8,987,157 |

**State Definition of Substantial Implementation (SI) of the Source Water Protection (SWP) Program**
IEPA uses best professional judgment to determine SI of SWP.

**FY 2012 Number/Population of Community Water Systems achieving Substantial Implementation**
811 systems (46.5%) with a population served of 8,479,929 (69.9%)

**Case Example: McHenry County, Water Resources Management Program**
McHenry County is one of the fastest growing counties in the nation. In 1990, the population in the county was approximately 182,000. In 2000 it had grown to 260,000: an increase of 42 percent. Projections indicate that population may grow to nearly 350,000 by 2020 and 450,000 by 2030. McHenry County's *only source* for all of their potable water including all private and public water supplies is groundwater. Given the projected growth rate and total reliance on groundwater for natural areas and human use, a Water Resource Action Plan was developed for McHenry County in 2007. The resulting Groundwater Protection Program Task Force recently concluded two years worth of collaborative meetings that aimed at unifying the county and its municipalities in protecting their water resources. In October 2009, final revisions to the Groundwater Protection Program were completed and ready for review and consideration by the McHenry County Board and governments. The plan lists a series of objectives that call for a holistic, coordinated, resource-based approach to water resources planning within the county and the municipalities it serves. This approach includes water conservation, wastewater re-use, pollution prevention, water supply protection and best management practices for planning and managing groundwater, surface water, potable water supplies, rivers, streams, floodplains, and wetlands.

For more information, contact:
Internet: http://www.epa.state.il.us/water/groundwater/source-water-assessment/index.html
Mail: Division of Public Water Supplies
P.O. Box 19276, Springfield, IL 62794-9276
Phone: (217) 785-4787 / Fax: (217) 782-0075

## Indiana Department of Environmental Management SWP Program

IDEM's Wellhead Protection Rule (327 IAC 8.4-1) requires that all community water systems implement a two-phase wellhead protection program. For Phase I, a system must create a wellhead protection (WHP) plan which identifies potential sources of contamination, and creates management and contingency plans for the designated WHP area. In Phase II the system must report to IDEM how the plan is being implemented within 5-, 7- or 10-years intervals following State approval of the Phase I plan, depending on the size of the system. For all other water systems, IDEM works to encourage voluntary efforts to produce source water protection plans and implement management measures to protect water supplies. All communities with an approved Phase I plan may apply for the Hoosier Water Guardian Award, which IDEM uses to recognize outstanding local WHP achievements. Water systems that receive this award can also work to achieve recognition from the Groundwater Foundation, Groundwater Guardian Program.

**June 2012 Water System Data**

| | CWS | NTCWS | TNCWS | Ground | Surface |
|---|---|---|---|---|---|
| **Number of Systems** | 803 | 564 | 2,782 | 4,034 | 115 |
| **Population Served** | 4,880,161 | 195,748 | 379,472 | 2,986,810 | 2,468,571 |

**State Definition of Substantial Implementation (SI) of the Source Water Protection Program**
SI for ground water systems is achieved when a system has an approved WHP plan in place and is implementing management measures defined by the state. SI for surface water is achieved when source water assessment plans are incorporated into watershed management plans, and the management measures defined by the State are being implemented.

**FY 2012 Number/Population of Community Water Systems achieving Substantial Implementation**
709 systems (88.3%) with a population served of 3,694,337 (75.7%)

**Case Example: Seelyville, Indiana**
In 2000, Seelyville Water Works opened its own wellfield and water treatment plant after years of buying water from a larger system in the County. Once their new plant came on line, the Town of Seelyville's water was characterized by discoloration, and taste and odor, resulting in public concern, negative media coverage and state enforcement orders. Seelyville made adjustments and corrected the treatment problems to bring the system into compliance, but also used the situation to generate interest in wellhead protection. Seelyville formed a Local Planning Team which developed a local public education campaign to raise awareness of the importance of protection. Seelyville Water Works built an educational table top display on water quality that they have taken to community events. At these events, Seelyville Water Works personnel talk to people about where their water comes from and the steps they can take to keep it safe and healthy to drink. They also use these events to survey public concerns and answer questions. With only one point source (a buried underground storage tank) located within their 5 year time of travel zone, they have worked with the property owner and IDEM in removing this tank. Future activities planned include: finding and sealing abandoned wells, promoting household hazardous waste pick-up days, exploring overlay zoning with Vigo County, and additional educational efforts.

For more information, contact:
Internet: http://www.idem.IN.gov/4142.htm
Mail: Indiana Department of Environmental Management, Office of Water Quality/Ground Water Section
100 North Senate Avenue, Indianapolis, IN 46204-2251, Phone: (317) 234-7476 / Fax: (317) 234-7424

The Iowa Source Water Protection (SWP) Program relies heavily on partnerships within the department as well as local, state, federal, and non-profit entities to maintain success. These partnerships range from gathering and sharing data to leveraging outside funds and technical assistance for best management practices, to promotion and education of source water protection within other existing programs. The Iowa SWP Program is divided into two programs: Targeted CWS and Non-Targeted. Both programs have three different phases:

1) **The 'Phase 1' assessment**. Typically provided at no cost to the water supply by the state, these assessments detail the water system's active wells, source water areas, susceptibility, and potential contaminants. A consumer confidence report is also included in the report. All community water systems in Iowa should have an accurate, updated assessment.
2) **The Source Water Plan**. If a community decides to protect its drinking water through SWP, it is encouraged to develop a SWP Plan. These plans detail action items to protecting its drinking water resource. As of 2012, the SWP Plan and efforts leading to the plan are often written by professionals and submitted to Iowa's Source Water Advisory Group (SWAG) for approval. However, in the IDNR SWP for *Targeted CWS Program*, the community itself coordinates, develops and submits the SWP Phase 2 Plan with assistance from the *Targeted CWS Program*. The community planning team utilizes the *Targeted CWS Program's* groundwater (gw) site investigation in the planning process. This process can aid to create local SWP ownership.
3) **Implementation**. After the plan has been submitted and approved, a community can start to implement the items listed in the plan. In the SWP *Targeted CWS Program*, the community planning team secures resources for BMP implementation as part of the planning process. By including this step in the process it has enhanced the implementation of BMP's in the *Targeted CWS Program* projects.

The ***Targeted CWS Program*** has successfully partnered with several local, state and federal conservation partners. USDA-NRCS, USDA-FSA, Iowa Dept. of Ag and Land Stewardship (IDALS), Soil and Water Conservation Districts (SWCD), landowners, Resource Conservation and Development (RC&D) entities and Pheasants Forever (PF) all aided in supporting planning and implementation of *Targeted CWS* this year. These conservation partners continue to provide the *Targeted CWS Program* technical assistance in the local planning, conservation programs information/implementation, and funding for *Targeted CWS* to install SWP management practices. This assistance is a result of the intensive groundwater site investigation that identifies the contaminant source as point source, localized non-point source or non-point source. Conservation partners can plan effectively if a source is found. Through the gw site investigation process the conservation partners are assured their local, state, and federal funding resources are utilized to address the correct source of the problem.

**Iowa Water System Data - as of 8/15/2012**

| | CWS | NTNC | TNC | Ground | Surface |
|---|---|---|---|---|---|
| **Number of systems** | 1130 | 132 | 637 | 1757 | 142 |
| **Population (*1000)** | 3213 | 47.2 | 77.2 | 1612 | 1549 |

**State Definition of Substantial Implementation**

Updated Definition for State Fiscal Year 2013:

"The Iowa Department of Natural Resources and selected technical advisors review all public water supply submittals for Source Water Substantial Implementation in Iowa. Substantial Implementation is accomplished when a public water supply has implemented protective measures for the top potential contaminant sources it can reasonably implement within its source water area. In order to be considered eligible the public water supply must comply with all regulatory standards at the time.

Each public water supply considered Substantially Implemented will be examined once every three years through a state sanitary survey, or when a new monitored contaminant has been detected."

**Number/Population of Community Water Systems reported achieving Substantial Implementation:**

Primary Community Water Systems: 66/909 (7%)
Community Population: 310,090/3,213,127 (10%)

**Case Example** – *Non-targeted systems:* Iowa's city of DeSoto won the American Water Works Association's (AWWA) national award for Exemplary Source Water Protection in 2012. Located along the South Raccoon River, the City uses shallow wells in the sand and gravel next to the river for its drinking water. For protecting their source water, in addition to locating and managing point sources, DeSoto was able to convert most of the 2-year capture zone from row crop to native vegetation using the USDA wellhead Conservation Reserve Program. Nitrates have decreased in raw and finished water since that conversion.

**Pilot Project Case Examples of *Targeted CWS Program's Current Implementation:***
***Remsen SWP Project*** included local coordination of a community planning team consisting of seven landowners, USDA-NRCS, Iowa Dept. of Agriculture and Land Stewardship (IDALS), Pheasants Forever (PF), city officials, and the IDNR. The local SWP Team coordinated with IDNR *Targeted SWP Program* to conduct a ground water site investigation to be conducted by the Contaminated Sites Section of IDNR. The nitrate source was identified as localized non-point source. *Resources and funding* for BMP implementation were received from IDALS, landowners, city utilities, and PF. Currently, the nitrate level in the municipal well has reduced from 27 mg/L to 15 mg/L because of this SWP implementation pilot project. Remsen received the AWWA award in 2010.

**Additional *Targeted CWS Pilot Projects*** experiencing SWP implementation success through partnerships include:
**Manchester Targeted Project*:*** *funds received from* USDA of 3.5 Million in MRBI funds for BMP implementation for 'FFY 2013 through 'FFY 2016.
**Elliott Targeted Project:** *funds received from* IDALS grant, Griswold School land donation, County Conservation Board, County Supervisors, County PF, USDA-NRCS & USDA-FSA programs, US Fish & Wildlife, among other funding sources. In addition, for local SWP education an outdoor classroom is also in plan development. Implementation is planned for FFY '2013 thru FFY '2016 for the many BMPs in this project.
**Dunlap Targeted Project:** local landowners, school system and city utilities currently working to decrease nitrate application in priority area (as indicated in SWP Plan). SWP initiated in 2011. The SWP implementation appears to be resulting in nitrate levels beginning to decline in city wells.
**Sioux Center Targeted Project:** Continues to implement BMPs (cover crops, NM, rotations) on 400 acre priority area. Dordt College and the landowners continue nitrate reduction research at this site for SWP purposes.
**Battle Creek Targeted Project:** Addressing a known (verified through DNR Contaminated Sites section) point source through collaborative work with the responsible party and the CWS. Addressing a known point source was instrumental in this pilot project.

For more information, contact Chad Fields, non-targeted swp program at: 319-335-2083
e-mail: chad.fields@dnr.iowa.gov or Rebecca Ohrtman, targeted cws program at: 515-281-0932,
e-mail: rebecca.ohrtman@dnr.iowa.gov
Non-Targeted CWS website: www.iowasourcewater.org
Targeted CWS website: http://www.iowadnr.gov/Environment/WaterQuality/SourcewaterProtection.aspx

## Kansas Source Water Assessment Program

Source Water Assessments (SWA) completed in 2004 form the basis for Source Water Protection Plans (SWPPs) in the State of Kansas. The Kansas Department of Health and Environment (KDHE)-Watershed Management Section (WMS) staff work with the Kansas Rural Water Association (KRWA) and Watershed Restoration and Protection Strategy (WRAPS) groups to complete SWPPs. The WRAPS program focuses on surface water bodies and KRWA primarily focuses on public water public systems relying on groundwater sources of drinking water.

WRAPS plans may serve as the source water protection plan for surface water bodies used for public water supply (PWS). A SWPP may also be developed for surface water body. Specific measures to protect PWS wellheads are typically not identified in a WRAPS plan and are usually addressed through a separate wellhead protection plan (WHPP) prepared by the public water supplier with assistance from KRWA or KDHE staff. All plans are reviewed and approved by KDHE-WMS. SWPPs can be implemented through local, state or federal assistance programs, depending on the specific protection measures included in the plan.

The ***Kansas Water Plan*** (www.kwo.org) outlines state policies and programs for comprehensive management of water resources. The Plan addresses both water quality and water quantity issues and establishes state priorities for targeting applicable state and federal programs. Source water protection planning has been identified as a priority. Additionally, the *Kansas Nonpoint Source Pollution Management Plan, 2010 Update* includes the following nonpoint source priorities and strategies related to public water supply systems:

1. Protection of public water supply watersheds and wellhead capture zones used for public water supply through the development and implementation of SWPP.
2. Maintain a statewide monitoring program to assess water quality conditions and determine attainment of water quality standards.
3. Encourage WRAPS stakeholder leadership teams to address source water and wellhead protection where applicable through collaborative, inter-jurisdictional watershed planning and coordination.
4. Enhance outreach to public water suppliers to actively participate in applicable WRAPS projects or develop a SWPP if the raw water supply is not addressed through a WRAPS project.
5. Work with WRAPS projects to facilitate SWPP development and implementation within WRAPS watersheds.
6. Demonstrate progress in implementation of all approved SWPPs by developing and maintaining a system to effectively track progress in plan implementation and working with the KDHE Public Water Supply Section's Capacity Development Program and other entities to explore potential funding opportunities for enhanced implementation of approved SWPPs.

**Water System Data (2012)**

| | CWS | NTCWS | TNCWS | Ground | GUI | Surface | Combination |
|---|---|---|---|---|---|---|---|
| **Number of Systems*** | 553 | 42 | 83 | 545 | 5 | 61 | 67 |
| **Population Served** | 2,690,242 | 21,315 | 4,117 | 744,866 | 155,953 | 343,078 | 1,385,827 |

*Not included in this count – 339 PWS systems that purchase treated water from one or more of the 678 PWS system included here. The *Population Served* numbers include all 1,017 PWS systems in the State.

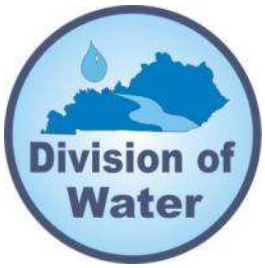
**State Definition of Substantial Implementation of the Source Water Protection Program**

Any public water supply system (PWSS) served by a surface water intake that is located within an active WRAPS Implementation project boundary is considered substantially implemented.

Any PWSS served by a surface water intake located outside of a WRAPS project boundary or any PWSS served by one or more wells in any location is considered substantially implemented under the following conditions:

1. A WHPP or a SWPP has been approved by the PWSS governing body.
2. One or more specific implementation activities identified in the approved plan have occurred.

For more information, visit http://kdheks.gov/nps/swap/ or contact the Kansas Department of Health & Environment-Watershed Management Section, 1000 SW Jackson St, Suite 420, Topeka, KS 66612.
Phone: 785.296.8038, Email: nps@kdheks.gov




## Kentucky Energy and Environment Cabinet
## Department for Environmental Protection

Source water protection is any law, ordinance, program, or activity that helps to obtain a secure and long-term drinking water supply of suitable quantity and quality. Since there are many threats to Kentucky's critical drinking water supplies, it is important that appropriate measures are taken to ensure the long-term protection of our water supply. Therefore, there are numerous federal, state, and local programs and requirements designed to address source water protection.

| **Water System Data (2012)** | CWS | NTNC | TNC | Ground | Surface |
|---|---|---|---|---|---|
| Number of systems | 402 | 21 | 39 | 151 | 311 |
| Population served | 4,441,302 | 11,025 | 4,895 | 598,346 | 3,858,876 |

**KY's Definition of Substantial Implementation of Source Water Protection:**
Substantial implementation would entail that the water system has met program requirements to delineate protection areas and perform contaminant source inventories with recommendations for protection.

**Number/Population of CWS systems reported as achieving substantial implementation:**
402 systems (100%) with a population served of 4,441,302 (100%)

**Case Example:** The Kentucky Water Supply Plan statute provides an important funding incentive to counties and municipalities to develop Water Supply Plans. The Water Supply Plans require either a Source Water Protection Area (surface water systems) or Wellhead Protection Plan (groundwater systems) be developed for every system. Having a Water Supply Plan became a requirement for requesting state and federal funding. Partial funding to local governments for developing Water Supply Plans was available through July 1996. Then after July 1999, KRS 151.118 mandated that the Natural Resources and Environmental Protection Cabinet *"shall not endorse projects that impact water under inter-governmental review for any county or municipality without an approved water supply plan."* This language, for the most part, requires local governments to have Water Supply Plans, as most governmentally funded projects require some type of water service. Counties without approved water supply plans will not be eligible for state or federal funds. This includes access to the state revolving funds created by the Clean Water and Safe Drinking Water Acts, community development block grants, and funding assistance through the Kentucky Governor's Water Resources Development Commission.

Kentucky DEP Division of Water
200 Fair Oaks Lane, 4th Floor
Frankfort, KY 40601
502-564-3410 water@ky.gov

## Louisiana Department of Environmental Quality Source Water Protection Program

The Louisiana Department of Health and Hospitals, the primacy agency for the Safe Drinking Water Act, entered into an interagency agreement with the **Louisiana Department of Environmental Quality (DEQ)** to develop and implement the State's Source Water Assessment Program (SWAP). The Aquifer Evaluation and Protection Unit of DEQ has the lead role in the development and implementation of the Louisiana SWAP. The Source Water Assessment Program is an evaluation of the source water that provides drinking water to each public water supply system in Louisiana. This evaluation determines the degree to which a public water supply is protected, or is at risk, from contamination. For communities that volunteer, the assessment results can be used to assist in implementing protection measures such as contingency planning, implementation of best management practices, adoption of local ordinances, and public education.

**Water System Data (Safe Drinking Water Information System 9/30/2012)**

| | CWS | NTCWS | TNCWS | Ground | Surface |
|---|---|---|---|---|---|
| Number of systems | 1,041 | 136 | 209 | 1,289 | 97 |
| Population Served (1000's) | 4,932 | 57 | 47 | 2,997 | 2,039 |

**State Definition of Substantial Implementation of the Source Water Protection Program**

Substantial Implementation is based on the completion of the following protection measures for each community/parish targeted for implementation.

1. A contingency plan is completed for each water system so that a plan is in place in case of an emergency or an interruption of water service.
2. Best management practices are introduced to operators of significant potential sources of contamination (SPSOCs) located near public supply wells and surface water intakes.
3. A model ordinance to protect public water wells is introduced to each governing body that has a public well within its jurisdiction.

**Number/Population of Community Water Systems reported as achieving Substantial Implementation (SDWIS 9/30/2012)**

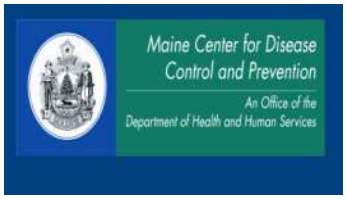
635 systems (60%) with a population served of 4,048,498 (82%)

**Case Example - Sibley Lake Watershed Individual Sewage Treatment System Improvement Project**

The Louisiana Department of Environmental Quality's Source Water Protection Program supported the Sibley Lake Watershed Individual Sewage Treatment System Improvement Project with a Clean Water Act §319 grant of $240,300. The City of Natchitoches provided a $160,200 match. The goal of the project was to protect Sibley Lake through inventory and inspection of all individual sewage treatment systems within a half-mile distance of the lake. Once the systems were identified, grant money was partnered with individual property owner funds to repair or replace malfunctioning systems identified as a significant contributing factor to the declining water quality. Through the cooperation of LDEQ, local health department personnel, and individual Sibley Lake residents, the City of Natchitoches inspected a total of 818 individual sewage treatment systems. Of this total, 171 or 21% were determined to be failed systems. Of the 171 failed systems identified, 147 systems were repaired or replaced. (Two systems were on the same property requiring only one replacement.) Of the 171 failed systems identified, there were 23 property owners that declined to respond to the city's invitation to take advantage of the grant opportunity. A list of these systems was provided to the Louisiana Department of Health and Hospitals for their records. The percentage of failed systems improved through this project was 86%.

For more information on Louisiana's Source Water Assessment Program see the link below.
http://www.deq.louisiana.gov/portal/PROGRAMS/SourceWaterAssessmentProgram.aspx
Louisiana Department of Environmental Quality
Aquifer Evaluation and Protection Unit
602 N. Fifth Street Baton Rouge, LA 70802

Phone (225) 219-3510

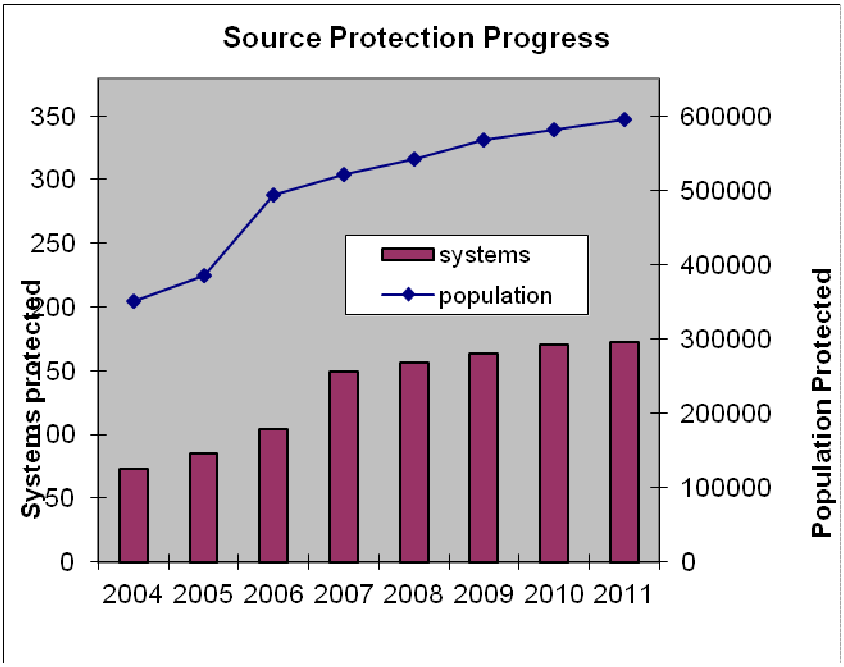



## Maine CDC Source Water Protection Program

Maine's 2,600 individual water sources (wells and surface water intakes) serve over 663,000 people (60% of the population). Largely dependent on ground water and a small number of surface water supplies, protection efforts are mostly voluntary. The exception is surface water systems that are not required to filter but which implement a protection plan. Forty percent 40% of Maine community ground water systems have adopted local wellhead protection ordinances which restrict or prohibit commercial or industrial uses within wellhead protection areas. Maine considers 45% of all of the state's community water systems as substantially implementing source water protection measures which serve more than 90% of the community population. Maine has added over 100 community systems to substantial implementation since completion of the source water assessments. The remaining systems are primarily very small systems (developments, nursing homes, and mobile home parks), and require different implementation strategies.

**State Definition of Substantial Implementation of the Source Water Protection Program**
Maine ground water systems are "substantially implementing its source water protection program" if the system has an ordinance or other binding land use control in place for the delineated area. Ground water systems which are implementing wellhead protection management plans, including contingency plans, are also considered as "substantially implementing its source water protection program." Surface water systems are considered as "substantially implementing its source water protection program" if the system has a watershed protection plan and is meeting the plan's requirements. These plans are a requirement of the Surface Water Treatment Rule (SWTR) to allow the system a waiver from filtration.

**Threats to Drinking Water Identified**: Through the state source water assessments, future development and growth were identified as a top threat to Maine's drinking water. More than 65% of all public water supplies serving more than 1,000 people are located in fast growing towns. Underground and above ground storage tanks, residential lawn care, septic systems, and gravel pits stood out as top current threats to the quality of drinking water. On-site wastewater systems (septic systems) were also identified as a significant threat to ground water supplies due to nitrate contributions in areas with susceptible geology and dense, unsewered development.




| Public Water System Data as of December 31, 2012 | Community Water Systems Protected | Total No. of CWS |
|---|---|---|
| Number of Systems Protected | 172 | 376 |
| Population Served | 633,913 | 691,167 |

**Case Example: Portland Water District** Portland serves about 200,000 people from Sebago Lake, a recreation destination, prized by boaters, anglers, and outdoor enthusiasts and surrounded by thousands of prized vacation and year-round homes. The Portland Water District maintains a filtration waiver through an aggressive watershed management program which focuses on land use in the watershed. The Water District's efforts have included:

- Purchasing over 2,500 acres of land near its intakes and managing these properties for low intensity recreation, tracking visitors and following up on any violations.
- Conducting a significant educational program for area schools and landowners reaching over 4,000 different adults and numerous school programs.
- Entering into a lease agreement with the Presumpscot Regional Land Trust (PRLT) to allow a regional recreational trail to pass through District watershed land.
- Participating in the Upland Headwaters Alliance, a group that includes five area land trusts, to develop land conservation priorities and acquire funding to increase land conservation efforts in the upper watershed.

**For more information, contact:**
**Andrew Tolman, Source Water Protection Coordinator**
http://www.maine.gov/dhhs/eng/water/
Maine CDC Drinking Water Program,
11 State House Station, Augusta, ME 04333-0011
(207) 287-6196
http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/swp/documents/swapforweb.pdf

## Maryland Source Water Assessment Program

The Maryland Department of the Environment is responsible for assessing the vulnerability of public drinking water sources, and works in partnership with local governments to develop and implement source water protection programs. A source water protection program is intended to add an extra layer of protection by ensuring that the water entering a public water system is as safe as possible. Preventing contamination at the drinking water source protects public health and makes good economic sense. The EPA approved Maryland's Plan in November of 1999. As of March 31, 2006, Maryland has completed source water assessments for all public drinking water systems in the State. Source water assessment reports have been provided to water suppliers and local governments, and have been made available to the public through placement in public libraries.

Ground water is the most commonly used source of water supply, and some regions of the State (Southern Maryland and the Eastern Shore) rely exclusively on ground water for their water needs. In Maryland, about 10% of the community water systems (around 50 systems) rely on surface water, yet these surface water systems serve about 80% of the population using public water systems.

**FY2012 Water System Data (from the Federal Safe Drinking Water Information System)**

| | CWS | NTCWS | TNCWS | Ground | Surface |
|---|---|---|---|---|---|
| Number of systems | 475 | 563 | 2,458 | 3,390 | 106 |
| Population Served (1000's) | 5,201 | 161 | 281 | 1,067 | 4,577 |

**State Definition of Substantial Implementation of the Source Water Protection Program**

"Strategy developed and initially implemented" means that a local planning team has been established, agreed upon a strategy, and implemented a portion of the strategy. "Substantially implemented" means that the most significant risks were or are being addressed. For example, if a community purchased the recharge area for a well or spring source for protection then the strategy is substantially implemented, even if it was accomplished many years ago. Groundwater systems are considered under substantial implementation when the source is a confined aquifer and monitoring results verify that there are no contaminants in the water supply.

**Number/Population of Community Water Systems reported as achieving Substantial Implementation:** 314 systems (66%) with a population served of 3,254,628 (63%)

**Case Example – Wellhead Protection**

MDE has provided funds to several communities and water suppliers for wellhead protection activities and plans. In addition, loans are also available for purchase of properties in wellhead and watershed protection areas. Application packages for grants and loans are available from MDE's Water Supply Program. MDE has worked with a number of local governments to help them implement source water protection measures, and will continue to work with them to ensure the safest possible sources for Maryland's public water systems. For information on a model Wellhead Protection Ordinance, please see the link below.
http://www.mde.state.md.us/programs/Water/Water_Supply/Documents/www.mde.state.md.us/assets/document/WSP-well_ord-2007.pdf

**For more information contact** Maryland's Source Water Assessment Program at
http://www.mde.state.md.us/programs/Water/Water_Supply/Source_Water_Assessment_Program/Pages/Programs/WaterPrograms/Water_Supply/sourcewaterassessment/factsheet.aspx

# Massachusetts Department of Environmental Protection Source Water Protection Program

The Massachusetts Department of Environmental Protection (MassDEP)'s Drinking Water Program conducts the Source Water Protection Program. There are 1,772 public water systems in Massachusetts serving 6.4 million people. MassDEP requires the development of local wellhead and watershed protection plans; the implementation of local land use controls to prohibit or control potential sources of contamination within water supply protection areas; and the use of best efforts to encourage other communities into which water supply protection areas extend to implement land use controls. There are state incentives that encourage voluntary local source water protection. The status of source water protection at each public water system is reviewed during sanitary surveys. Massachusetts conducts a Drinking Water Supply Protection Grant Program that awards funds to public water suppliers to purchase land and conservation restrictions in water supply protection areas.

The completion of MassDEP's Source Water Assessment and Protection (SWAP) Program resulted in the identification and mapping of potential sources of contamination for all public water systems and the issuance of recommendations for reducing the risk of contamination from those sources. A report and map were provided to each public water system and municipal official. The reports are available on-line on the MassDEP web site: www.mass.gov/dep/water/drinking/swapreps.htm

Assessments of potential sources of contamination are conducted for all new drinking water sources. Public water systems, local officials, and community groups continue to use the SWAP reports and maps to build on their local protection work.

| Public Water System Data as of December 31, 2012 | Community Water Systems | NTNC | TNC |
|---|---|---|---|
| Number of Systems | 523 | 278 | 968 |
| Population Served | 6,142,748 | 75,792 | 170,705 |

| | |
|---|---|
| Total Number of Ground Water Systems | 1,589 |
| Total Number of Surface Water Systems | 183 |

State Definition of Substantial Implementation

MassDEP reports 100% substantial implementation of a source water protection strategy. MassDEP defines substantial implementation as having a comprehensive state strategy for surface water and ground water protection that includes regulatory and non-regulatory components that reduce the risk of contamination to drinking water sources.

Case Example – Updating SWAP Potential Sources of Contamination

In 2010 DWP introduced an electronic Annual Statistical Report (eASR) that replaced paper reporting. Electronic reporting saves staff time, paper, mailing costs, and other resources for both public water suppliers and MassDEP. The new eASR allows public water suppliers the opportunity to update information on the potential sources of contamination that were identified in their water supply protection areas during the SWAP Program. The updated SWAP information is then migrated to DWP's database. DWP is in the process of reviewing the extent of water supplier participation in the voluntary update of their SWAP information.

**For more information, contact:**

Kathleen Romero, Source Water Protection Coordinator
MassDEP - Drinking Water Program
1 Winter St, Boston, MA 02108
(617) 292-5727


## Michigan Department of Environmental Quality Source Water Protection Program

Michigan has 67 Great Lakes water intakes and 8 inland water intakes, providing drinking water to over 60 percent of the State's population, and the rest of the State's population is served by public and private wells. MDEQ does not require systems to develop and implement source water protection plans but strongly encourages systems toward protection through technical assistance in partnership with the Michigan Rural Water Association, local health departments and a State Wellhead Protection matching grant program, which offers 50% matching grants funded from the Drinking Water State Revolving Loan Fund Wellhead Protection Set-Aside. Typical uses for these funds include financing for abandoned well search and management programs, development of educational materials, passage of zoning language to protect groundwater, emergency management training for spills in wellhead protection areas, and/or creation of partnership agreements between agencies and communities within the wellhead protection area. Grant assistance is based on the number of people served by the water supply, and the number of wells the supply operates. Applicants are ranked according to a points system, as outlined in the grant application.

**June 2012 Water System Data**

| | CWS | NTNCWS | TNCWS | Ground | Surface |
|---|---|---|---|---|---|
| **Number of Systems** | 1,383 | 1,348 | 8,414 | 10,836 | 308 |
| **Population Served** | 7,623,569 | 307,688 | 1,012,171 | 2,996,042 | 5,947,386 |

**Summary of State Definition of Substantial Implementation (SI) of the Source Water Protection Program**
For surface water intakes: surface water intake protection plan approved by the state or the intake critical assessment zone does not intersect land and the community water supply actively participates in an early warning monitoring network. For groundwater systems: system has a State-approved wellhead protection program or community water supply sampling results confirm less than 1 tritium unit.

**FY 2012 Number/Population of Community Water Systems achieving Substantial Implementation**
448 systems (32.4%) with a population served of 6,082,733 (79.8%)

**Case Examples**

**Kalamazoo Michigan Movie Trailer Outreach**
The City of Kalamazoo Wellhead Protection Committee has developed, with the help of a production company, eight 30-second movie trailer animated advertisements shown at a 10-movie theater complex. Three ads at a time are shown before the start of every movie and are replaced every few months with a new group of three. The ads are designed to engage the audience about their drinking of groundwater, the importance of protecting the source of groundwater, the threats to groundwater, and a website link to obtain more information. In addition, the WHP Committee prepared three "still" ads included in a movie trailer for another 14-screen movie theater in the City.

**Groundwater Management Tool:**

The Michigan Groundwater Management Tool (MGMT) is a software platform developed by Michigan Department of Environmental Quality (MDEQ) that utilizes spatially compiled groundwater data and allows for the automated analysis of ground water flow. As a tool in ground water modeling, the software allows for the interactive mapping of ground water flow directions based on available data. The MGMT software has the ability to analyze and assess groundwater flow and ultimately delineate wellhead protection areas for community and non-community public water supplies throughout Michigan. MGMT now allows MDEQ to provide delineations at no charge for the smaller community and non-community water systems. This program provides an opportunity for training and redefining substantial implementation for the smaller water systems that had been somewhat limited in what they could do. MDEQ is conducting outreach training to provide owners/operators with provisional delineations, well records, source water assessment/checklists, and continuing education credits. As of October 2012, MDEQ trainings had been attended by 230 operators/owners. As of March 2013, MDEQ had provided provisional delineations for 826 community water supplies and 1,271 non-community, non-transient supplies. This is in addition to the 355 community supplies which had completed the traditional delineations. MDEQ plans on providing provisional delineations to the Upper Peninsula supplies in the near future. The provisional delineations along with an assessment guide will help system owners and operators assess the risks source water and prepare action plans to help reduce risks. More information about this tool and its effectiveness is available through the contact information listed on the Michigan DEQ Fact Sheet.

For more information, contact:
http://www.michigan.gov/deq/0,1607,7-135-3313_3675_3695---,00.html
Community Drinking Water Unit
P.O. Box 30473, Lansing, Michigan 48909
(517) 241-4796 ~ Fax: (517) 241-1328

## Minnesota Department of Health SWP Program

The **Minnesota Department of Health (MDH)** implements a mandatory wellhead protection program under Minnesota Rules, Chapter 4720.5100 - 4720.5590. Minnesota's voluntary approach to source water protection for surface water intakes is described in *Recommendations and Guidance Pertaining to the Development and Implementation of Source Water Protection Plans for Public Water Supplies Relying on Surface Waters* (PDF: 745 KB/67 pages) . Currently, the MDH SWP program receives 58% of its funds from Federal Safe Drinking Water Act grant funding, 33% from the Minnesota Clean Water Legacy Fund, and 9% from State water system licensing fees. On November 4, 2008, Minnesota voters approved the Clean Water, Land, and Legacy Amendment (Minnesota Constitution, Sec.15) to the constitution. *This amendment provides additional funding to 1) meet a State goal of having wellhead protection plans in place* for all community systems by 2020 and 2) award grants to public water suppliers for implementing SWP activities.

| June 2012 Water System Data | CWS | NTNCWS | TNCWS | Ground | Surface |
|---|---|---|---|---|---|
| **Number of Systems** | 961 | 491 | 5,584 | 6,919 | 117 |
| **Population Served** | 4,275,236 | 72,558 | 533,633 | 3,462,986 | 1,418,441 |

**State Definition of Substantial Implementation (SI) of the Source Water Protection Program**

SI is achieved when a system has implemented at least 75% of the measures in either its MDH-approved wellhead protection plan or its MDH-endorsed surface water intake protection plan. This is based upon the actions that a public water supplier has scheduled to do during each year over the 10-year period that a plan is in effect.

**FY 2012 Number/Population of Community Water Systems Achieving Substantial Implementation**
273 systems (28%) with a population served of 3,245,610 (76%)

**Case Example: Cold Spring, Minnesota**

The city of Cold Spring is working with local landowners and others to reduce the amount of nitrogen fertilizer applications in its wellhead protection area. This is being done to address concerns about rising nitrate nitrogen levels in the city's drinking water. The city has partnered with the MDH, Minnesota Department of Agriculture, Minnesota Rural Water Association, Stearns County, and the Natural Resource Conservation Service and has benefited from a Source Water Protection Plan Implementation grant from the Legacy Fund.

The City formed a team, studied the issue, prioritized fields where recharge to the city's water supply wells was likely occurring and worked with area farmers and landowners to begin reducing nitrate loading. Cold Spring purchased nitrogen-inhibitor products from the local agriculture co-op, which applied the products to farmers' fields reducing fertilizer levels from 8 to 16 percent of their previous application rates. The use of nitrogen inhibitors, combined with the additional reduction in applied fertilizer elsewhere, resulted in a decrease of 4,100 pounds of nitrogen applied on 277 acres near the city's wells. The partnership has increased the trust and cooperation between the city and local farmers and landowners. Cold Spring developed a groundwater quality monitoring plan for its wellhead protection area and has installed four monitoring wells to measure the long-term effectiveness of nitrogen reduction efforts.

Contact: www.health.state.mn.us/divs/eh/water/swp/index.htm
Minnesota Department of Health
Source Water Protection Unit, Drinking Water Protection Section
P.O. Box 64975, St. Paul, MN 55164-0975, (651) 201-4681/ Fax: (651) 201-4601

MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY

The Mississippi Department of Environmental Quality's (MDEQ's) Source Water Assessment/Protection Program strives to identify and address potential sources of contamination and abandoned wells that may pose problems for public water supply (PWS) wells. The program offers a proactive approach to groundwater protection and serves to coordinate related efforts among the Mississippi State Department of Health (with its primacy over the state drinking water program), the Mississippi Rural Water Association, and the MDEQ. Much of the program focus is devoted to addressing protection of the 275 PWS wells with the highest identified relative susceptibility.

**Water System Data:**

| | CWS | NTNC | TNC | Ground | Surface |
|---|---|---|---|---|---|
| Number of Systems | 1,111 | 84 | 73 | 1,256 | 12 |
| Population Served | 3,133,821 | 75,480 | 11,507 | 2,984,384 | 236,424 |

**Mississippi's Definition of Substantial Implementation of Source Water Protection:**

The Source Water Protection Strategy for unconfined PWS wells involves regulatory program integration/coordination with the MDEQ's UST, RCRA, CERCLA, Brownfields and Uncontrolled Sites programs. Implementation of this strategy is considered complete when the appropriate regulatory programs are contacted regarding any related groundwater contamination concerns that may need addressing. The protection strategy for wells using confined aquifers involves verifying the natural geohydrologic confinement of aquifers. Implementation of this strategy is considered complete when adequate confinement is verified.

**Number/Population of CWS systems reported as achieving substantial implementation:**

728 systems (65%) with a population served of 1,954,435 (62%)

**Case Example:** One of the most significant achievements realized by the MDEQ's Source Water Protection Program is the coordination of efforts with the Underground Storage Tank (UST) Program, resulting in the enhanced protection of the 253 unconfined PWS wells operating in the state. The location of existing storage tanks within PWS delineated protection areas is tracked using the MDEQ geographic information system (GIS). This information is then used to guide compliance efforts or direct proper regulatory response for existing USTs. It also is used to identify new sites that require the installation of double walled USTs. Also, MDEQ and the Health Department are coordinating efforts to plug abandoned water supply wells near operating wells using the Drinking Water State Revolving Fund.

MDEQ, Office of Land and Water Resources
P.O. Box 2309
Jackson, MS 39225
601-961-5395
https://www.deq.state.ms.us/mdeq.nsf/page/GPB_WellheadProtection?OpenDocument

MISSOURI DEPARTMENT OF NATURAL RESOURCES

## Missouri Source Water Protection Program

The Missouri Source Water Protection Program incorporates elements of the Missouri Wellhead Protection Program with the Missouri Source Water Assessment Plan to provide a comprehensive state level protection program designed to assist public water suppliers and the communities served with increasing protection to their sources of drinking water. Participation with our program is voluntary on the part of public water suppliers and there has been limited success in terms of the total number of participating systems; however, through improved incentive programs, public awareness, and other focused efforts our program is undergoing revisions that are designed to promote and improve our program, as well as increase the number of participating water systems. Efforts are also underway to further integrate source water protection activities with other general water quality programs dedicated to protecting the waters of our state. The state-provided source water assessments (described within our Missouri Source Water Assessment Plan) produced through previous initiatives provide a foundation upon which any community in Missouri can begin the process of source water protection planning and, ultimately, implementation.

Data from the 2012 Census of Missouri Public Water Systems

| **Community Water System Data** | | | | |
|---|---|---|---|---|
| **Primary CWS** | **GW** | **SW** | **GWUDISW** | **TOTAL** |
| (number) | 1,099 | 65 | 4 | 1,168 |
| (population served) | 1,695,680 | 2,507,331 | 16,235 | 4,219,246 |
| | | | | |
| **Secondary CWS** | **GW** | **SW** | **GWUDISW** | **TOTAL** |
| (number) | 144 | 155 | 2 | 301 |
| (population served) | 179,129 | 870,118 | 11,805 | 1,061,052 |
| **Total Number of CWS** | | | | **1,469** |
| **Total Population Served by CWS** | | | | **5,280,298** |

| **Noncommunity Water System Data** | |
|---|---|
| **NTNC** | 223 Total Systems |
| **TNC** | 1,089 Total Systems |

Missouri Definition of "Substantial Implementation"

The State of Missouri defines "substantial implementation" of source water protection planning efforts as the implementation of any best management practice that is intended to facilitate additional protection planning or increase protection from existing or potential contamination to source water protection areas. Endorsement of a submitted source water protection plan by the Missouri Department of Natural Resources (the department) constitutes substantial implementation by the water system under this definition. The department offers four year approvals to endorsed plans, and if a participating water system has allowed an endorsed plan to expire and has not made efforts to renew their approval, they are no longer considered to be involved with substantial implementation.

Numbers of Community Public Water Systems that achieved Substantial Implementation as of March 1, 2011

Primary Community Water Systems: 45 (3.8% of all Primary Community systems)

Total Population Served: 629,491* (approximate) (12% of total population served by all community systems) *Figure includes population served by participating primary community systems and secondary community systems that purchase water from those primary systems.

Case Example

The Missouri Department of Natural Resources has significantly revamped the funding opportunities that are designed to facilitate source water protection awareness and implementation. Two grant programs, the Abandoned Well Plugging program and the Source Water Protection Development and Implementation program, have been streamlined to simplify the application process and to more efficiently utilize the extraordinarily valuable funds authorized through the Safe Drinking Water Act for this purpose. Application materials and instructions are now available through the Missouri Department of Natural Resources' Website at www.dnr.mo.gov. Informational brochures for each grant program are being prepared, as is a new source water protection newsletter, "The Source Protector: The Official Newsletter of the Missouri Source Water Protection Program." These materials are anticipated to be available by 2013.

The Missouri Department of Natural Resources is also engaged with a pilot program, the "Our Missouri Waters Initiative," to transition to a watershed-based approach to water quality permitting, with a special emphasis on focusing available Safe Drinking Water Act, Clean Water Act, and other sources of water quality funding opportunities in each of three pilot watersheds in the state. Although a work in progress, it is anticipated that the Department will assign a watershed coordinator for each watershed in the state following completion of the pilot program (2013) to further facilitate efficient use of available funds to maximize protection efforts in each watershed. In tandem with this initiative, the recently completed "Enabling Source Water Protection" project, of which Missouri was one of eight states selected to participate, has also provided the Department with a variety of strategies and tools to further align water quality protection efforts in a practical, innovative, and efficient manner.

To learn more about the Missouri Source Water Protection Program, please visit http://drinkingwater.missouri.edu and http://www.dnr.mo.gov/env/wpp/pdwb/swpp.htm. You may also contact the Source Water Assessment and Protection Coordinator at 573-526-0269 or write to the Missouri Department of Natural Resources' Water Protection Program at PO Box 176, Jefferson City, Missouri, 65102-0176.

## Montana Source Water Protection Program

Montana's Source Water Protection Program (SWPP), approved by EPA in November 1999, was developed using the maximum possible public participation, including input from the PWSs. Montana SWPP objectives include: identify the source(s) of water used by PWSs (e.g. the area of the watershed or aquifer from which a public water system's drinking water is drawn), including those areas most critical for protection; identify and inventory potential contaminant sources (PCSs); assess the susceptibility of PWSs to PCSs; and make the results of the delineation and assessments freely available to the public via website: http://nris.mt.gov/wis/swap/swapquery.asp.

**Montana's Definition of Substantial Implementation of the Source Water Protection Program**
The Montana SWPP considers that substantial implementation of a source water protection strategy occurs when all significant potential contaminant sources identified in the source water assessment cause no higher than a moderate susceptibility of the drinking water source to significant potential contaminant source (PCSs).

**Water System Data (from the Federal Safe Drinking Water Information System as of 9/30/2011)**

| | CWS | NTNCWS | TNCWS | Ground | Surface |
|---|---|---|---|---|---|
| **Number of Systems** | **698** | **262** | **1,142** | **1,880** | **222** |
| **Population Served (1,000's)** | **714** | **82** | **173** | **560** | **409** |

**Number/Population of Community Water Systems reported as achieving Substantial Implementation**
529 systems (76%) with a population served of 520,306 (73%)

**Montana SWP Program Highlights**
**New PWS Source Review.** One of the highlights of Montana's Source Water Protection Program is protection of public health by preventing contamination of proposed new drinking water sources. We review the location of all new proposed public drinking water sources to ensure they will not have high susceptibility to significant potential contaminant sources. In 2012, this was about 38 new drinking water source reviews.

**On-Site Wastewater.** The Montana SWP Program continues to provide training approximately 5-10 times per year to citizens, realtors, water system operators, and well drillers on the operation and maintenance of domestic wells and septic systems. This was borne out of the most prevalent/most threatening potential contaminant source (PCS) process which identified on-site wastewater as a significant concern to public drinking water sources. SWP staff offer the training though our standard water system operator training venues, through local realtor associations, and through the Board of water well contractors. Attendance ranges from about 15 in small communities up to 100 attendees.
An outcome of this process over the past several years is the development of more reader-friendly education materials on the operation of wells and septic systems. The "Under Ground Comics" has been well received and we have distributed about 5,800 copies. Information and handouts are available at the SWPP website at: http://www.deq.mt.gov/wqinfo/swp/.

Under Ground Comics - Septic & Well Care for Clean Water

**Online Tools.** In addition to making source water delineations and assessments available online, the Montana DEQ Map Query System is a useful online tool to find a specific public water supply (PWS) and display information that exists for the surrounding area. http://www.deq.mt.gov/wqinfo/swp/mappingSystem.mcpx

**For more information, contact:** Joe Meek, Phone: (406)444-4806, Email: jmeek@mt.gov

Source Water Protection Program Montana Dept. of Environmental Quality, Planning, Prevention and Assistance Division, 1520 East Sixth Avenue, Helena, Montana 59620

## Navajo Nation Source Water Assessment and Protection Program

The Source Water Assessment Program (SWAP) builds upon and emphasizes work done within the Navajo Nation Environmental Protection Agency Public Water Systems Supervision Program's (NNEPA PWSSP) Wellhead and Watershed Protection Programs. The NNEPA PWSSP SWAP takes existing data sources and Susceptibility Assessments to develop Source Water Protection Plans (SWPPs) which are then implemented using management approaches. A final SWPP for each system has been made available to each public water system. To ensure security for the community's drinking water supplies, the distribution of the complete SWPP is up to the owner of the public water system. A statement in each public water system's *Consumer Confidence Report* gives a summary of the system's susceptibility to potential contamination and notifies its customers that the SWPP is available for review. Completed Susceptibility Assessments are used to focus on prevention resources for drinking water protection. The NNEPA PWSSP strongly relies on Susceptibility Assessments to determine the levels of implementation as part of the source water protection program. The SWPPs developed are an attempt to provide information to water systems on options for the implementation of management approaches. Additionally, the NNEPA PWSSP provides information about certain available funding sources for the implementation of protection measures, such as well abandonment.

**Water System Data (from the Safe Drinking Water Information System), 2012**

| | CWS | NTCWS | TNCWS | Ground | Surface |
|---|---|---|---|---|---|
| **Number of Systems** | **141** | **14** | **5** | **152** | **8** |
| **Population Served** | **150,177** | **5,397** | **909** | **137,681** | **18,802** |

**Definition of Substantial Implementation of the Source Water Protection Program**

Substantial Implementation occurs when a public water supply system initiates the Management Approaches in Section VIII of its Source Water Protection Plan (SWPP). These Management Approaches are typically Best Management Practices (BMPs) that can be used to manage present and future contamination sources within a source water protection area.

**As of December 2012, the percent of the population served by community water systems where risk to public health is minimized by source water protection = 95% (148,792/156,483).**

**Case Example: SWP Project**

After prioritization of potential contaminant sources, the NNEPA PWSSP staff compiled strategies for each source within the public water system that would protect the aquifer(s). For example, the top management strategy for one public water system consisted of decommissioning three improperly abandoned unregulated water wells owned by the Navajo Nation Water Technical, Construction, Operations Branch (the owners). The strategy included providing public education and awareness to the owners and to the Navajo Nation Community (Chapter) on the reasons for decommissioning these wells. It was important to develop the education materials for well decommissioning. Because the Navajo Nation lacks its own Well Abandonment Requirements, the Navajo Nation refers to state well abandonment procedures. These three wells that were decommissioned either provided a direct pathway from potential surface contamination and/or had elevated levels of arsenic and radionuclides from aquifers stratigraphically above the main water bearing formation for the public water supply. Educational materials were provided for the local Chapter that targeted leaders and the decision makers in community development. Public Education also incorporated domestic waste water requirements or development restrictions within the protection zone of the public water supply. Cooperative management of the source water protection area was ideal in making this project a success. As such, the NNEPA PWSSP makes available to the public GIS maps so that environmental planning is incorporated into community development; where the placement of gas stations, hospitals, waste water systems, to name a few, are an important part of a growing community that must consider the future stability of its drinking water supply.

**Navajo Nation Environmental Protection Agency, Public Water Systems Supervision Program**
P.O. Box 339, Window Rock, AZ 86515, (928) 871-7755, http://navajopublicwater.org/SWAP2.html

## Nebraska Department of Environmental Quality Source Water Protection Program

Nebraska DEQ continues to make grants available to public water systems that serve a population of 10,000 or less through the Drinking Water State Revolving Fund. Eligible projects include source water protection measures and activities in existing source water protection areas or designated future source water protection areas, and the associated communities. Community involvement and education is also a central theme in these grants. Projects are expected to provide long-term benefits to drinking water quality, quantity, education, and/or security. The NDEQ is also updating Source Water Protection informational pamphlets to distribute at meetings and to interested utility operators and their boards. NDEQ also sponsors quarterly Wellhead Protection Network meetings. This forum provides an opportunity for city, state, regional, and non-profit groups to discuss Nebraska source water protection issues and topics. An education subcommittee has arisen from this group to take steps to target education toward public water systems with rising drinking water nitrate concentrations. The subcommittee is also developing new drinking water protection signs to mark the delineation of a public water system's wellhead protection area.

| Water System Data | CWS | TNC | NTNC |
|---|---|---|---|
| **Number of Systems** | 592 | 562 | 163 |
| **Population Served** | 1,479,159 | 51,110 | 49,873 |

**State Definition of Substantial Implementation of the Source Water Protection Program:**
"Substantial implementation occurs when a community has done/is doing one or more of the following: received a Source Water Protection grant; has developed a state-approved wellhead protection plan and has adopted related ordinance(s) / zoning at the city level; organized and implemented the decommissioning of abandoned wells within the wellhead protection area; or implemented best management practices within their source water protection area"

**Community Water Systems reported as achieving Substantial Implementation:**
Number of Communities = 247
Population = 581,606
Percent of Total Population = 39%

**Case Example:** The City of Wilber, Nebraska began targeting nitrate contamination of their drinking water when a concentration of 8 ppm nitrates became a frequent occurrence in three of the four city wells. Wilber's wellhead protection (WHP) area encompasses approximately 4000 acres of cropland and resulting land practices have lead to nitrate contamination of the drinking water. To reduce nitrate loading to the groundwater, the City worked collaborated with the University of Nebraska Extension, Lower Big Blue Natural Resources District, Wilber-Clatonia FFA Chapter, Nebraska Rural Water Association and the Natural Resources and Conservation Service to educate and encourage producers to implement nitrogen and irrigation best management practices within the WHP area.

Source Water Protection grant funds were utilized to fund vadose zone (area between water table and land surface) sampling to understand the extent of nitrate contamination below the crop's root zone in the WHP area. Nitrates in the vadose zone are inaccessible to the plant and thus destined to leach into groundwater. A cost-share program was also offered to farmers and landowners in the WHP area to install irrigation water flow meters, evapo-transpiration (ET) gauges and soil moisture probes. These items allow the producer to more accurately time irrigation thus enabling the producer to use less groundwater and reduce the amount of nitrogen fertilizer being leached out of the crops root zone. Once meters were installed, 3 years of records were recorded. All irrigation and domestic wells within the WHP area were also sampled to determine nitrate and coliform levels. When surveyed about the irrigation management practices, producers reported saving 1-2 pivot rotations per year resulting in approximately 2 acre-inch water. This project has been expanded and taken district-wide and incorporated in the WHP area of other communities

For more information, contact the source water coordinator at (402) 471-6988 or visit http://www.deq.state.ne.us.
Nebraska Department of Environmental Quality, 1200 N Street, P.O. Box 98922, Lincoln, NE 68509-8922

State of Nevada
Department of Conservation & Natural Resources
Nevada Division of Environmental Protection NDEP.nv.gov

## Nevada Division of Environmental Protection (NDEP) Source Water Protection Program

NDEP replaced its former Wellhead Protection Program (WHPP) with an Integrated Source Water Protection Program (ISWPP). The primary goal of the ISWPP is the protection of public drinking water supplies through the implementation of contaminant source control at the community level. NDEP implemented the ISWPP by garnering multi-jurisdictional support for and coordination of locally driven Source Water Protection Programs in several Nevada counties. The Program is based on a county-wide approach to empower communities to get involved in developing and implementing source water protection plans. Between 2009 and 2012, three counties in Nevada completed the development and began implementation of countywide Wellhead/Source Water Protection Plans with assistance from the ISWPP. In 2012, two additional counties were also selected for assistance. In addition, NDEP developed a web-based GIS tool for internal agency use which enables staff to map public water supply wells, their Source Water Protection Areas, and associated SWAP vulnerability risk rankings. Lyon County Utilities and Truckee Meadows Water Authority won Exemplary Source Water Protection Awards from CA-NV AWWA in 2009.

**Water System Data (from the Safe Drinking Water Information System), 2012**

| | CWS | NTNC | TNC | Ground | Surface |
|---|---|---|---|---|---|
| **Number of Systems** | **211** | **120** | **233** | **516** | **48** |
| **Population Served (1000's)** | **2596** | **92** | **22** | **304** | **2406** |

**State Definition of Substantial Implementation of the Source Water Protection Program**

*"Groundwater systems included in State-endorsed WHP/SWP plans that receive state assistance for WHP/SWP plan implementation, and surface water systems that receive approval for filtration avoidance status under the Watershed Control Program (WCP)."*

**As of December 2012, Percent of the population served by community water systems where risk to public health is minimized by source water protection = 20% (510,342/2,595,847)**

**Case Example:** Since 2009, NDEP's ISWPP has been working in several counties to assist the development of Community Source Water Protection Programs. Douglas County is the first community to develop a countywide plan under the ISWPP and to commit to a countywide approach to protecting their water resources. The "Community Wellhead Protection Plan for Public Water Systems in Douglas County, Nevada" (Plan) was presented to the Douglas County Board of Commissioners for formal approval adoption of the plan in May 2012. The board unanimously voted in favor of adopting the plan and incorporating it into the Douglas County Master Plan. Subsequently, NDEP formally endorsed the Plan and provides ongoing support for implementation activities. The Plan establishes wellhead protection areas for every public water system well located within Douglas County. The most significant management strategy implemented is a preemptive protection measure. It is an agreement by the Douglas County Planning Department to submit new development proposals to affected public water systems for comment prior to approval of any new developments in wellhead protection areas. The plan review process is currently being modified to include consideration of all wellhead protection areas and comments that are made by the public water systems will be included in the developments' "Conditions for Approval." The County has also committed to exploring the possibility of developing a countywide wellhead protection ordinance in the future. Land and business owners located in the wellhead protection areas have been formally notified and have received educational materials regarding their sensitive location. Douglas County developed a website (douglascountycleanwater.com) to highlight the plan, its goals and present it to the residents of the community. The community has also adopted a countywide education curriculum targeting 6$^{th}$ graders throughout the county. The "Dynamic Earth" science kit offers education on basic water concepts: water on earth, the water cycle, groundwater supplies, and contaminants of concern. Surface and groundwater model demonstrations for the classes are also an option for teachers and have become very popular.

Nevada Division of Environmental Protection, Bureau of Water Pollution Control, (775) 687-9418
901 S. Stewart Street, Suite 4001, Carson City, NV 89701, http://ndep.nv.gov/bwpc/sourcewater.htm

# New Hampshire Department of Environmental Services
# Drinking Water Source Protection Program

The NHDES Drinking Water Source Protection Program provides guidance and assistance to water suppliers and municipalities and enforces state regulations to protect the state's sources of drinking water. However, effective protection relies on the combined efforts of the state, water suppliers, municipalities, businesses, institutions, and individuals whose activities have the potential to affect source water quality. The DWSPP's role includes coordinating source water protection (SWP) activities with other state programs and non-governmental organizations.

NHDES completed its Source Water Assessment Program in 2003, having prepared and distributed assessments for approximately 3,052 public water supply sources. An additional 200 assessments were updated or added between 2003 and 2006. Summaries of the assessments can be viewed at http://des.nh.gov/organization/divisions/water/dwgb/dwspp/dwsap.htm.

The assessments have proven valuable in several ways: as a starting point for water systems to develop and enhance their SWP efforts, as a planning tool for local and regional SWP (e.g., to inform municipal groundwater protection efforts), and as a means for NHDES to identify groups of water systems or geographic areas in need of follow-up or further attention. SWP plans are voluntary in New Hampshire except for large CWS sources brought on line since 1994 and for all CWS sources since 1999. However, the vast majority of CWS and NTNC systems have opted to participate in the Phase II/V chemical monitoring waiver program, which requires systems to implement SWP in order to qualify. **Consequently, 96 percent of CWS sources and 85 percent of NTNC sources had "initial implementation" of SWP** as of September 2012.

| Water System Data | Community Water System | NTNC | TNC | CWS Ground | CWS Surface |
|---|---|---|---|---|---|
| Number of systems | 681 | 438 | 1286 | 644 | 37 |
| Population Served (1000's) | 865 | 92 | 220 | 334 | 531 |

* Source: Sept. 2011 Summary- Note: "Ground" includes groundwater only and purchased sources; "Surface" includes all other CWSs.

**Substantial Implementation of Source Water Protection**

In order for NHDES to consider a CWS to have achieved substantial implementation of SWP, all of the system's sources must have (1) one of several protection measures (land use restrictions, conservation land, local inspection program) in place, (2) no source-related sanitary survey deficiencies, and (3) a current emergency plan on file with NHDES. For surface sources, a watershed management program must be in place. As of September 2012, 68 percent of CWSs, serving 64 percent of the CWS population had substantial implementation of all of their sources.

**Case Example: Annual Drinking Water Source Protection Workshop**

Each year, the DWSPP holds an all-day SWP workshop in cooperation with the American Ground Water Trust. In 2012, the workshop featured a morning plenary session and four afternoon tracks and drew over 200 attendees, primarily water system operators and managers, municipal officials, local and regional planners, and consultants. NHDES's annual SWP Awards are also presented at the workshop.

**For more information, contact:**

New Hampshire Department of Environmental Services
Drinking Water and Groundwater Bureau
29 Hazen Drive, PO Box 95, Concord NH 03302-0095
(603) 271-7061
http://des.nh.gov/organization/divisions/water/dwgb/dwspp/index.htm


The New Jersey Department of Environmental Protection (NJDEP) had the lead in the development of the source water assessments, with technical assistance from the USGS. NJDEP does not plan to update the assessments for existing systems, except when, for example, a new well is added to an existing system. In that case, a source water protection area will be delineated and an inventory of potential pollution sources will be developed. The source water assessments for the community systems, and the methodology used to generate them, are available on the Internet at: http://www.nj.gov/dep/swap/creport.htm

**2012 Water System Data** (from SDWIS Fed):

| | CWS | | NTNC | TNC |
|---|---|---|---|---|
| | Ground | Surface | | |
| Number of systems | 443* | 161** | 747 | 2460 |
| Population served (1000s) | 1,969 | 5,907 | | |

*includes 23 systems that purchase GW; **includes 129 systems that purchase SW

**Number/Population of CWS systems reported as achieving substantial implementation (defined below):**
604 systems (100%) with a population served of 7,876,500 (100% of those served by CWS systems)

**Case Example: Source water protection for the New Jersey Highlands:**
New Jersey's Highlands Region is an 860,000-acre swath of land that is the source of drinking water for more than half the state's residents. In August 2004, the Highlands Water Protection and Planning Act charged an 11-member Highland Council with developing a Regional Master Plan. The Council made use of a Highlands resources joint study by the USGS, Rutgers University and the U.S. Forest Service to set out a 410,000-acre Preservation Area where stringent water quality standards and pollution controls were to be imposed and development was to be strictly controlled. The remainder of the Highlands was designated as the Planning Area, in which development would be dictated by "smart growth" principles. The Master Plan was designed to put an end to the loss and fragmentation of Highlands land and insure the quality and quantity of vital drinking water sources.

**Programs unique to the State:**
The state defines Category One (C-1) waters as waters to be protected from any measurable changes in water quality because of their exceptional ecological, recreational or water supply significance. Developments involving either a ¼-acre increase in impervious surface or a 1-acre disturbance are not allowed within a 300-ft wide buffer area running along each side of a C-1 stream or encircling a C-1 water body such as a lake.

New Jersey has Open Space Tax Programs on both the county and municipal levels: all 21 counties impose a property tax (from ¼ to 6 cents per $100 of assessed value) and approximately 40 percent of the state's municipalities do so as well. The money collected can be used to purchase land at market value or conservation easements, to preserve farmland, and to develop or improve parkland. The money does not go into the general fund, and the purchases made serve to slow down development that can sometimes raise concerns for source water.

**NJ's Definition of Substantial Implementation of Source Water Protection:**
NJ believes that all public water systems have a substantially implemented source water protection program. NJ anticipates continually improving that program, but in their view they have successfully established an adequate source water protection program. NJDEP defines the State's substantial implementation by the application of its regulatory programs, which protect the State's drinking water sources by preventing, controlling, and monitoring potential contaminant sources.

## New Mexico's Source Water Assessment and Protection Program

The New Mexico Source Water Assessment and Protection Program (SWAPP) is a federally funded voluntary program that assists communities in protecting their drinking water supplies. This is accomplished by identifying potential sources of contamination, evaluating the susceptibility of wells and surface water intakes to contamination, and working with communities, water utilities and service providers to develop Source Water Protection strategies. The SWAPP aims to involve local communities in source water protection through public outreach and education and through the formation of local planning teams. A community-based pollution prevention strategy such as a Wellhead Protection Program, insures a degree of environmental awareness which can prevent groundwater contamination and protect public supply wells. The ultimate goal of the SWAPP is to generate active community involvement in the management and protection of the drinking water supply.

**Water System Data (Safe Drinking Water Information System 9/30/2012)**

| | CWS | NTCWS | TNCWS | Ground | Surface |
|---|---|---|---|---|---|
| Number of systems | 595 | 148 | 406 | 1,094 | 55 |
| Population Served (1000's) | 1,836 | 52 | 72 | 1,072 | 888 |

**State Definition of Substantial Implementation of the Source Water Protection Program**

* To review the Substantial Implementation definition, go to Appendix B.

**Number/Population of Community Water Systems reported as achieving Substantial Implementation (SDWIS 9/30/2012)**

108 systems (18%) with a population served of 903,209 (49%)

**Case Example –** The Albuquerque area relies on two sources for its drinking water: ground water from the Santa Fe Group Aquifer and San Juan-Chama surface water diverted from the Rio Grande via the San Juan-Chama Drinking Water Project. The aquifer is a vital resource on which not only Albuquerque, but the entire Middle Rio Grande Valley, depends for drinking water. Studies have shown that only about half of the water pumped from the aquifer is being replenished; the rest is "mined" – lost forever. San Juan-Chama surface water reduces dependence on the aquifer, allowing it to recover to serve as a drought reserve in times of minimal precipitation. In just two years of San Juan-Chama Drinking Water Project operation, the U.S. Geological Survey (USGS) has reported that ground water levels are rising in the Albuquerque Basin.

The Office of the State Engineer monitors Water Authority use of San Juan-Chama surface water. Conditions include mandatory reductions in use through water conservation, no diversion during low river flow periods, no consumption of native Rio Grande water, and no impairment to downstream senior water rights holders. The transition to surface water, reuse and recycling, aquifer storage and recovery, along with water conservation, are the foundation of the Water Resources Management Strategy. The goal is to preserve and protect the aquifer to provide a safe and sustainable water supply.

For more information about New Mexico's SWAPP see the following link:
http://www.nmenv.state.nm.us/dwb/water_protection/

New Mexico Environment Department
Drinking Water Bureau
525 Camino De Los Marquez, Suite 4
Santa Fe, NM 87505
505-476-8631


The New York State Department of Health (NYSDOH) had the lead role in development of the source water assessments and, together with the New York State Department of Environmental Conservation, now has a major role in implementing source water protection. The source water assessments are not on the Internet but are available to the public on CDs held at county health departments and NYSDOH district offices. The State has no plans to update the assessments, but new systems will required to have an assessment performed, according to guidelines now being developed by NYSDOH.

**2012 Water System Data (from SDWIS Fed):**

| | CWS | | NTNC | TNC |
|---|---|---|---|---|
| | Ground | Surface | | |
| Number of systems | 1655* | 782** | 740 | 5,684 |
| Population served (1000s) | 3,959 | 13,922 | | |

*includes 126 systems that purchase GW; **includes 470 systems that purchase SW

**Number/Population of CWS systems reported as achieving substantial implementation (defined below):**
1618 systems (61%) with a population served of 17,200,000 (96%)

**Case Example: Source water protection for water systems that do not filter**
Surface water systems serving New York City and Syracuse have been granted permission not to filter, provided they maintain a comprehensive program of protection in their respective watersheds. As a result, almost every tool and technique of source water protection can be observed in use in these watersheds: land acquisition, septic system maintenance and rehabilitation, upgrades of water treatment plants, stream bank stabilization and restoration, stormwater controls and retrofits, forest management, outreach and education. In addition, more than 90 percent of the major farms in both watersheds participate in a voluntary program to introduce best management practices into every aspect of their operation.

**Programs unique to the State:**
Approximately 300 water systems—both surface and ground water—are covered by so-called Watershed Rules & Regulations (WR&Rs), which are early environmental regulations (since 1885) protecting watersheds beyond the boundaries of a municipality served by a water system. These regulations allow inspection of watersheds for practices that may threaten water quality, even outside a municipality.

New York State also has the Agriculture Environment Management (AEM) Program, a voluntary program based on the Ontario Environmental Farm Plan Program and Ohio's Whole Farm Planning. The program is administered by county Soil & Water Conservation Districts (SWCDs) and has been very successful in raising farmers' awareness of the environmental impacts of their operation and in helping them introduce appropriate best management practices. The SWCDs are non-regulatory entities that have developed especially good relationships with farmers in the program, just as the non-regulatory New York Rural Water Association has developed the trust of water system operators.

**NY's Definition of Substantial Implementation of Source Water Protection:**
Substantial implementation of source water protection is achieved when existing programs at the state or local level, through legislation, regulation, or advocacy, minimize the potential for source water contamination. In New York State, several categories of water systems have achieved substantial implementation of source water protection. This can be in the form of a higher standard of oversight by a County Health Department. Watershed rules and regulations are sections of NYSDOH regulations, protecting specific watersheds and public water system sources. These began in 1885 and continue in effect. Some systems are protected by local or regional wellhead protection programs that substantially implement source protection. Systems in watersheds that have special scrutiny including the Great Lakes Basin and Hudson River as well as those falling within the Adirondack and Catskill Parks are substantially protected. The New York Rural Water Association has worked with a number of systems on source protection and some of those have achieved substantial protection not qualifying under one of the previously mentioned groups.


## North Carolina Source Water Protection Program

The Public Water Supply Section of the North Carolina Department of Environment and Natural Resources is a national leader regarding source water assessment and protection. North Carolina's source water assessment results were first released to the public in April 2004. Since that time, assessments were updated in April 2005, May 2007 and May 2010. Another update is currently in progress for each of the 9000+ public water supply sources in the state. North Carolina has effectively integrated its assessment data into the objectives and priority structures of other agencies and programs. Therefore, source water assessment data remains positioned as a relevant tool to influence planning, project implementation and funding priorities. To disseminate SWAP data and assist in project decision-making, North Carolina maintains web-based, GIS mapping applications.

**Water System Data (2012):**
The totals reported in each category below include systems with active sources combined with purchase-only systems.

| | CWS | NTNC | TNC | Ground | Surface |
|---|---|---|---|---|---|
| Number of systems | 2,071 | 393 | 3,565 | 5,684 | 450 |
| Population served | 7,728,704 | 114,454 | 314,369 | 1,942,460 | 6,216,995 |

**NC's Definition of Substantial Implementation of Source Water Protection:**
Substantial implementation of source water protection includes protection resulting from statewide regulations, resources leveraged by various partnership initiatives, education and outreach activities, program enhancement efforts, and the development and implementation of local source water protection plans. The combined impact of these broad categories of source water protection is complex and impossible to quantify with respect to each individual community public water system. However, to satisfy EPA's data request, North Carolina assigns relative weighting factors and percent complete factors to the identified source water protection categories so that the relative accomplishments of the distinct categories of source water protection can be aggregated and expressed as the percentage of substantially implemented source water protection across the state. Using SDWIS data, the percentage of substantially implemented source water protection is converted mathematically to "# of CWSs with SWP" and "# of People served by CWSs with SWP", in accordance with EPA reporting measures (e.g., SP-4a and SP-4b).

**Number/Population of CWS systems reported as achieving substantial implementation:**
1,124 (53%) with a population served of 4,029,239 (54%).

**Notable Strategies:**
The North Carolina Source Water Protection Program participated in a national project designed to align water quality protection, land use programs, and policy decisions to better protect drinking water sources. This project resulted in a series of new initiatives. For example, North Carolina has established a statewide Source Water Collaborative to help incentivize and promote local source water protection. This Collaborative includes professional associations, nonprofit organizations, university programs, Councils of Government, and state agencies. Other promising initiatives include increased cooperation with Clean Water Act programs and the development of an awards program to recognize outstanding drinking water protection projects. Additionally, the North Carolina Source Water Protection Program administers a low interest loan program for land conservation projects, where such projects serve to protect a public drinking water source.

**Contact Information:**
NC Source Water Protection Program, 1634 Mail Service Center, Raleigh, NC 27699-1634
Phone: 919-707-9068, email: swap@ncdenr.gov , http://www.ncwater.org/pws/swap/

# North Dakota Source Water Protection Program

The North Dakota Source Water Protection Program was developed in response to the 1996 Safe Drinking Water Act amendments that required all states to define and assess the source waters of public water systems. All public water systems that have wells or intakes are participants in the Source Water Protection Program. In 1999, North Dakota's Source Water Assessment Strategic Plan was approved by EPA.

The North Dakota Department of Health (NDDH) is the lead state agency responsible for the completion of all elements of public water systems (PWS) source water assessments. The North Dakota Source Water Assessment Plan (SWAP) contains source water delineations, contaminant source inventories and susceptibility determinations for each PWS system. Modifications or amendments for source waters will be routinely evaluated by the NDDH or the local PWS. North Dakota's SWAP program can be found at: http://www.ndhealth.gov/wq/gw/sourcewater.htm

The primary water protection activity for PWSs in North Dakota has been the Wellhead Protection (WHP) Program. More than 180 community water systems (CWS) currently participate in the WHP program. This represents 90 percent of the population served by community water systems utilizing ground water. Nearly 50 percent of the participating communities have initiated all of the essential elements. Geographic information systems (GIS) have become increasingly important in the management and display of geographic, cultural, and environmental data. The WHP program uses GIS for preparing and updating WHP maps.

**Water Systems Data (as of 1/20/13, from NDDH)**

| | CWS | NTNCWS | TNCWS | Ground | Surface |
|---|---|---|---|---|---|
| Number of systems | 341 | 42 | 222 | 443 | 162 |
| Population served (1000's) | 628 | 10 | 25 | 283 | 344 |

**State Definition of Substantial Implementation of the Source Water Protection Program:**

Substantial implementation is the establishment and upkeep of an approved local Source Water Protection Plan (surface and groundwater) and/or the undertaking of relevant and sustainable actions that address priority risks as identified in the source water assessment. A formal definition does not exist, but instead the state uses the steps below to assess a new area.

Step 1: Review/revise Source Water Protection Area
Step 2: Review/revise Potential Contaminant Source Inventory
Step 3: Review/revise Susceptibility Analysis
Step 4: SWP/WHP hydrogeologic investigations to define real vs. perceived threats
Step 5: Removal/remediation of identified contaminants
Step 6: Locating new PWS wells and completing new delineations/source inventories
Step 7: Track city planning (land trades, purchases, ordinances, etc.)
Step 8: Public awareness/education/training

**Number/Population of Community Water Systems reported as achieving Substantial Implementation as of 1/20/13**

162 (48%) systems with a population of 472,337 (75%)

**Case Example**

Due to the increase in oil activity in North Dakota, the state has been dealing with the issues that arise from production processes, including source water protection. The NDDH has been working in conjunction with the state Division of Oil and Gas as well as North Dakota Rural Water Systems (NDRWS) on protection measures. The greatest oil activity is in the western half of the state where surface water is the primary source of drinking water. The NDDH and several state agencies are reviewing options designed to minimize potential impacts to source water protection areas from oil-field related spills. The NDDH with NDRWS is working towards greater public education and awareness of zoning issues within wellhead protection areas. Specifically, the work consists of visiting individual systems, setting up town meetings, and distributing informational flyers. Individual systems are noted as paying closer attention to the oil and gas production activities in the nearby areas. The NDDH is receiving a higher volume of calls regarding source water information and well testing, particularly for privately-owned wells. Currently, the NDDH is developing a specialized team with members from several divisions including water quality, waste management, and air quality that will focus on oil and gas spill response and remediation, ranging from trucking and road accidents to pipeline leaks and on- site spills.

Contact: NDDH-Division of Water Quality
Attn: Shannon Suggs
918 East Divide Ave., 4th Floor
Bismarck, ND 58501-1947
Phone: 701.328.6409
Email: ssuggs@nd.gov

## Ohio EPA SWP Program


The Ohio Environmental Protection Agency (OEPA) conducts a voluntary source water protection (SWP) program. Since 1997, OEPA has endorsed 140 plans for communities that serve more than 3.7 million Ohioans. Volunteer teams called Source Water Environmental Education Teams (SWEET), and two National Rural Water Association technicians help water systems develop SWP plans using templates to facilitate the completion of a written document. Once complete, the protection plan is sent to the OEPA districts for review and endorsement. OEPA issues a certificate of recognition to water systems that produce State-endorsed SWP plans. OEPA has also produced many useful outreach tools which are available on the OEPA Source Water Protection website. OEPA gives water system operators are continuing education credit for assisting SWP efforts. Systems with SWP plans receive priority points for low-interest loans.

OEPA updates assessments during sanitary survey visits and writes assessments for new systems. Community water systems are required to complete or update a source water protection plan within two years after OEPA new well construction approval. Assessments are can be requested directly from OEPA or accessed at the following password - protected Web site: ***http://www.epa.ohio.gov/ddagw/swap.aspx***.

**June 2012 Water System Data**

| | CWS | NTCWS | TNCWS | Ground | Surface |
|---|---|---|---|---|---|
| **Number of Systems** | 1,236 | 712 | 2,874 | 4,524 | 298 |
| **Population Served** | 10,206,357 | 218,046 | 387,450 | 3,408,982 | 7,402,871 |

**State Definition of Substantial Implementation (SI) of the Source Water Protection Program**

SI is achieved when ground water systems use either a source of water that has a low susceptibility to contamination or use protective strategies to address priority potential contaminant sources or chemicals of concern. Inland river systems achieve SI when protective strategies are implemented to address the priority potential contaminant sources or chemicals of concern within the entire watershed or within critical protection areas. Lake Erie systems achieve SI when protective strategies address the priority potential contaminant sources or contaminants of concern within the vicinity of their intakes, nearest on-shore watershed, or Lake Erie Management Plan.

**FY 2012 Number/Population of Community Water Systems achieving Substantial Implementation**

435 systems (35.2%) with a population served of 6,600,000 (64.7%)

**Case Example: SWEET Teams help Versailles, Ohio Produce a Source Water Protection Plan**
An Ohio Environmental Protection Agency (OEPA) Source Water Environmental Education Team (SWEET) helped the Village of Versailles develop and complete a SWP plan at a cost of $14,800. The Village intends to use the plan to heighten the local awareness of the importance and value of its water resource and develop measures to protect its water supply. For more information on Ohio EPA SWEET Teams, visit: http://wwwapp.epa.ohio.gov/ddagw/SWEET/**.**

For more information, contact:
Internet: http://www.epa.state.oh.us/ddagw/swap.aspx
Mail: Division of Drinking and Ground Waters

P.O. Box 1049, Columbus, OH 43216-1049
Phone: (614) 644-2752 ~ Fax: (614) 644-2909

## Oklahoma DEQ Source Water Assessment and Protection Program

The Source Water Assessment Program (SWAP) builds on and extends work already in progress in wellhead and watershed protection programs. Oklahoma's SWAP uses existing data sources to develop draft plans which will then be physically verified by Oklahoma's Department of Environmental Quality (DEQ) field staff with water system staff for accuracy. A final report for each system has been made available to each system. To ensure security for our drinking water supplies the dissemination of the complete report is up to the individual system. However, a statement in each system's Consumer Confidence Report must give a summary of the system's vulnerability and/or susceptibility score and notify customers that the report is available for review. Completed assessments can be used to focus prevention resources on drinking water protection. EPA and the DEQ strongly encourage linking the source water assessments to implementation of source water protection (SWP) programs. The reports developed through the program will attempt to provide information to water systems on options for protection programs. Additionally, DEQ will provide information about available funding sources for the implementation of protection measures. Funding for this program has been earmarked through the Drinking Water State Revolving Fund (DWSRF).

**Water System Data (Safe Drinking Water Information System 9/30/2012)**

| | CWS | NTCWS | TNCWS | Ground | Surface |
|---|---|---|---|---|---|
| Number of systems | 1,092 | 102 | 482 | 924 | 752 |
| Population Served (1000's) | 3,577 | 25 | 36 | 702 | 2,936 |

**State Definition of Substantial Implementation of the Source Water Protection Program**
Substantial Implementation occurs when a public water supply system initiates Best Management Practices (BMPs) outlined in its management plan.

**Number/Population of Community Water Systems reported as achieving Substantial Implementation (SDWIS 9/30/2012)**
792 systems (71%) with a population served of 3,138,778 (88%)

**Case Example –** The DEQ, specifically the groundwater support staff, has produced eye-catching flyers, fact sheets, and bill inserts that communities can use to educate their customers. They can be customized to fit a community's specific needs. For SWP, a flyer insert encouraged the use of a slow release fertilizer and maintaining taller grass to achieve a lush lawn by highlighting the fact that it isn't just your lawn that is affected when you over- fertilize. A monthly newsletter, the Wellhead Word, is published to help community groundwater systems implement wellhead protection. Partnerships are the common denominator of ensuring success of our Wellhead Program. A survey to our regular newsletter recipients asked how they were executing a Wellhead Protection Program (WHPP), what outreach material they would be useful and how DEQ could improve the program. Several readers who have not implemented a WHPP cited funding as the reason why. In response DEQ developed a presentation geared toward community leaders and decision makers and notify them of the benefits of a WHPP. In these times of budget cuts and financial hardships, it is important that heads of communities are making informed decisions. We also alerted communities about the services we offer, free of charge, such as using GPS and navigation equipment to capture the location information of wells and potential sources of contamination. During emergency situation, such as a tornado, knowing the locations of threats to drinking water is vital in saving time and resources in ensuring the drinking water source's security. A successful WHPP cannot safeguard them from disasters, but it can help to ensure that safe drinking water is available to their citizens.

For more information see link below for Oklahoma's Source Water Assessment Program.
http://www.deq.state.ok.us/WQDnew/sourcewater/index.html

**Oklahoma Department of Environmental Quality**
Water Quality Division, 800-869-2365

P.O. Box 1677

Oklahoma City, OK 73101-1677

## Oregon Drinking Water Source Protection

The Oregon Department of Environmental Quality (DEQ) works in partnership with the Oregon Health Authority (OHA) to help communities protect their drinking water sources. Implementation of drinking water protection for source waters of public water systems requires the implementation of Clean Water Act (CWA) authorities. The drinking water protection staff at DEQ focuses on *integrating the drinking water information into other water quality efforts, using the programs/authorities specific to the CWA*.

State of Oregon Department of Environmental Quality

DEQ draws upon their drinking water source protection GIS database to prioritize pollution reduction strategies for National Pollutant Discharge Elimination System-permitted discharges upstream of drinking water intakes, emergency response, wastewater treatment plants, Total Maximum Daily Load development and implementation, technical assistance for nonpoint sources of pollution, rule-based restrictions for underground injection controls, Groundwater Management Area implementation, and Oregon's statewide land use planning periodic review input. Newer initiatives for the DWP program include pesticide and pharmaceutical collection events, DEQ Toxics Reduction coordination, algal bloom studies, turbidity standards, CWA 303(d) listings for drinking water intakes, and nitrate impact statistical analysis.

**Water system Data (from the Federal Safe Drinking Water Information System as of 9/30/2011)**

| | CWS | NTNC | TNC | Ground | Surface |
|---|---|---|---|---|---|
| Number of systems | 875 | 333 | 1,396 | 2,298 | 305 |
| Population Served | 3,374,323 | 70,086 | 200,723 | 800,409 | 2,844,648 |

**State Definition of Substantial Implementation of the Source Water Protection Program**

A substantially implemented strategy occurs when state, regional, and/or local agencies determine that strategic protection actions have been taken to appropriately reduce the risk of potential contamination within the community water system source water area, based on the state/local identified significant threats and sensitivity of the source water or source area.

**Number/Population of Community Water systems reported as achieving Substantial Implementation**

183 systems (21%) with a population served of 3,811,947 (82%)

**Case Examples**

**Clean Water Act Integrated Reports –Drinking Water as Beneficial Use**

DEQ drinking water staff coordinates regularly with Clean Water Act (CWA) staff to revise standards and new stream listings for "water quality limited" streams in Oregon. DEQ's drinking water protection staff and CWA implementation staff developed a consistent methodology to include the data for drinking water MCLs into the existing water quality criteria under the CWA for purposes of the 303(d) data queries. The first step is a thorough cross-walk of MCLs versus existing water quality standards. Oregon's EPA Integrated Reports apply the narrative criterion in state rules (OAR 340-041-0007(11)) that establishes the *statewide goal of protecting the potability of drinking water*. *For the most recent CWA 303(d) listing, DEQ obtained records from public water system (PWS) operators for drinking water systems,* including the number of shutdowns occurring due to turbidity levels that exceeded the system's operating capacity. This data collection resulted in listing specific source waters as "*Category 5: Water quality limited, 303(d) list, TMDL needed" under the CWA*. DEQ proposed that five water bodies be on the Water Quality Limited 303(d) list due solely to drinking water beneficial use limitations. Drinking water staff will work with the TMDL staff to address the TMDL listed source waters.

**Public Water System Locator Web Tool – NPDES permits**

Oregon DEQ developed a web-based tool designed to allow agency staff, permittees, and the public to easily identify and obtain contact information for downstream public water system intakes. This was initially designed to assist NPDES permittees as they develop and implement Emergency Notification and Response Plans but is also useful for

other applications as well. DEQ's water quality permit staff use the tool to identify beneficial uses. For example, suction dredge miners applying for the new CWA 700-PM general permit are directed to this tool to identify downstream public water supplies. The website also provides a summary of the Source Water Assessment Report for surface water systems and links to PWS data online for contact information of public water suppliers that may be affected by, for example, upstream sewage system overflows or storm-related turbidity problems.

**Collecting Ambient WQ Data Above Drinking Water Intakes**
Due to resource constraints, there is generally a lack of ambient water quality data above drinking water intakes. Using SDWA funds (to provide technical assistance to public water systems), DEQ drinking water and laboratory staff collected samples above drinking water intakes and at wells for 48 public water systems. The project included collecting samples from high-risk drinking water sources and analyzing for over 250 Oregon-specific herbicides, insecticides, pharmaceuticals, VOCs (including cleaners), fire retardants, PAHs, personal care products, and plasticizers. Low levels of contaminants were found in 85% of the samples collected, including microbes, steroids, metals, phthalates, and pesticides. This data supplements ambient river data and groundwater data in DEQ's public database for water quality. The data will be accessed and used for many other CWA water quality reports and queries, including the EPA Integrated Report for 303(d) listings.

**Drinking Water and Human Health Criteria –new water quality standards**
Water quality standards establish goals for Oregon's surface waters such as protecting communities of fish and other organisms that live in the water, sources of drinking water and helping ensure that the fish we eat from Oregon waters is safe. New standards adopted in 2011 include revised human health criteria for 113 toxic pollutants based on a per-capita fish consumption rate of 175 grams per day. With these rule revisions, DEQ also adopted and made effective revisions to the water quality permitting rules addressing intake credits, site-specific background pollutant assessments, and revisions associated with Oregon Departments of Agriculture and Forestry for carrying out each agencies' roles to address nonpoint sources of pollution. The revised standards will result in a reduction in toxic pollutants discharged in Oregon's waterways, leading to greater protection of drinking water sources and safer fish to eat.

Sheree Stewart, Drinking Water Protection Coordinator, Oregon DEQ, 503-229-5413.
http://www.deq.state.or.us/wq/dwp/dwp.htm


The Pennsylvania Department of Environmental Protection (DEP) conducts assessments of the susceptibility of public water systems to potential sources of contamination. The purpose of conducting assessments is to educate the public and promote the development of local, voluntary source water protection. DEP offers support for municipalities, water suppliers and the public to develop local source water protection programs.

**FY2012 Water System Data (from the Federal Safe Drinking Water Information System)**

| | CWS | NTCWS | TNCWS | Ground | Surface |
|---|---|---|---|---|---|
| Number of systems | 2,042 | 1,191 | 5,858 | 8,504 | 587 |
| Population Served (1000's) | 10,774 | 481 | 746 | 2,517 | 9,484 |

**State Definition of Substantial Implementation of the Source Water Protection Program**
Establishment of a state- approved local Source Water Protection Plan or the undertaking of relevant and sustainable actions/efforts that address priority risks as identified in the source water assessment.

**Number/Population of Community Water Systems reported as achieving Substantial Implementation**
522 systems (25%) with a population served of 7,602,168 (70%)

**Case Example - GIS-Based System Source Water Assessments for Small Community Water Systems in Pennsylvania**
Penn State University was asked to assist the Source Water Protection Branch in assessing potential contamination threats to small drinking water systems in Pennsylvania. An automated, GIS-based approach was developed to rapidly complete the required analyses. Assessments were completed for over 14,000 wells.
A series of steps were conducted as part of the overall source water assessment process. These steps were automated so that groups of 1,000 or more wells could be assessed in "batch" mode on a dedicated computer. The steps that were completed in sequence for each well assessed included:

1) Delineation of a wellhead protection area (WHPA) around the well.
2) Identification and quantification of potential threats to drinking water supplies located within the WHPA. This activity was accomplished using existing GIS data sets available with the state.
3) Susceptibility analysis of groundwater sources to contamination. This analysis was based on a methodology previously developed by DEP. In this case, the "overlay and analysis" steps were automated by the use of customized programming (i.e., "scripts") done using Avenue, the programming language used with the ArcView GIS software.
4) For each source (i.e., well) evaluated, a concise report (i.e., MS-Word document) was automatically generated, complete with introductory text, tables and maps.

For more information:
http://www.dep.state.pa.us/dep/deputate/watermgt/wc/Subjects/SrceProt/SourceAssessment/default.htm

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PA Department of Environmental Protection
Rachel Carson State Office Building
400 Market Street | P.O. Box 8555
Harrisburg, PA 17105-8555

Phone: 717-772-4048 | Fax: 717-787-9549
Email: gbowling@state.pa.us<mailto:gbowling@state.pa.us>,
http://www.depweb.state.pa.us/portal/server.pt/community/dep_home/5968

## Rhode Island Source Water Protection Program

The State of Rhode Island Department of Health (HEALTH), Office of Drinking Water Quality focuses on source water protection, while the Rhode Island Department of Environmental Management administers regulatory programs for groundwater and surface water protection and designates wellhead protection areas. Rhode Island considers 97% of all of the state's community water systems as substantially implementing source water protection measures. These systems serve more than 99.9% of community population. Over the past two years, Rhode Island has made progress through their partnership with the Atlantic States Rural Water Association Source Water Circuit Rider Program. Rhode Island NRCS includes drinking water source areas in ranking criteria for funding conservation practices to protect water quality. The state is currently completing assessments for new systems that have come on-line since 2003. Sources for two new community systems (out of 86 total community systems) have not been formally assessed. The population served by these new community systems is roughly 310.

Substantial Implementation of Source Water Protection

Small community systems" have little or no authority over land use outside of the property immediately surrounding their source of supply; therefore, they rely on municipal ordinances and regulation for source protection. Small systems whose source protection areas are within municipalities that have ordinances, zoning overlays, and/or site plan review standards intended to protect drinking water quality, or where protection of drinking water quality is a secondary benefit of such, are considered to have reached substantial implementation. Large systems that have made use of a "penny per hundred" program for land acquisition, that have funded education and outreach programs, or implemented other elements in their Water Supply System Management Plan, are considered to have reached substantial implementation.

| **Public Water System Data as of December 31, 2012** | **Community Water Systems Protected** | **Total No. of CWS** |
|---|---|---|
| Number of Systems Protected | 84 | 86 |
| Population Served | 108,488 | 108,577 |

Updated Delineations & Assessments

Each of the 29 large water systems regulated by the Rhode Island Water Resources Board update their Water Supply System Management Plans, which include a water quality protection component, every five years. These are reviewed by DEM, RI HEALTH and the Statewide Planning Program with final approval issued by Board staff. The USGS and DEM have also generated new protection areas for some existing sources. In some cases, these redelineations have created additional contributing area in need of protection activity. The USGS is currently delineating new contributing areas for the village of Kingston, the town of North Kingstown, and the wells for the University of Rhode Island. RI HEALTH has been updating SOCs monitoring waiver reviews for CWSs and NTNCWSs; these assessments will be shared with both the public water systems and town planners.

Case Example: Source Water Protection Plans completed by Atlantic States Rural Water Association

Since 2009, Elizabeth Myre, a source water circuit rider funded by EPA under the National Rural Water Association, created detailed source water assessments and management plans for three individual public drinking water systems and one larger community with multiple systems. The plans included recommendations from community leaders, water utility staff and other state programs such as the Non-Point Source Education for Municipal Officials program (NEMO). The plans included recommendations to reduce sources of nitrate, such as fertilizers, cesspools or septic systems, within wellhead protection areas.

Future Protection Efforts of the State Source Water Program:

RI HEALTH is interested in seeing Source Water Protection Plans developed for areas where several small public water systems are located along highway corridors. These areas include: U.S. Route 1, including Charlestown, RI, and state Routes 6 and 146.

**For more information, contact:**

Clayton Commons, Acting Source Water Protection Coordinator
Rhode Island Department of Health
Office of Drinking Water Quality
Phone: (401) 222-7769
http://www.health.ri.gov/drinkingwaterquality/


**Introduction:** Developing and implementing reasonable and effective Source Water Protection Plans is a critical goal of the SWP program. Cooperation between federal, state, and local governments, citizen groups, and the PWS are key to the development and implementation of a successful plan. DHEC will not require any specific management strategy, but offers a range of management options (i.e., a "tool box" approach) from which to choose. Any one or combination of management strategies can be used to best address the risks to the water supply identified in the assessment. These can range from non-regulatory strategies such as public education, signage, or land ownership to regulatory options at the local level such as zoning or ordinances.

| **Water System Data (2012):** | CWS | NTNC | TNC | Ground | Surface |
|---|---|---|---|---|---|
| Number of systems | 604 | 126 | 729 | 1,121 | 338 |
| Population served | 3,840,718 | 42,550 | 41,748 | 595,994 | 3,329,022 |

**SC's Definition of Substantial Implementation of Source Water Protection:**
Substantial implementation is achieved for a particular drinking water source whenever there is ongoing awareness and /or activism over and above the implementation of the regulatory programs.

**Number/Population of CWS systems reported as achieving substantial implementation:**
70 systems (12%) with a population served of 914,931 (24%)

**Case Example:** In addition to the standard methods for Source Water Protection, such as education and outreach, technical assistance to water-system operators, and SRF-loan-award incentives; the South Carolina Department of Health and Environmental Control developed a cooperative approach between the Source Water Protection Program and the Drinking Water Program's permitting section for all new groundwater sources. Technical advice is provided by hydrogeologists to permit writers with respect to the susceptibility of proposed wells to contamination and to the feasibility of the proposed well to produce both the desired well yield and acceptable water quality with the proposed well location and design.

An example of this cooperation involved the replacement of a defective well at a rural convenience store where publicly supplied water was not available. While reviewing well replacement sites, the Source Water Protection Program reviewed potential contamination sources using GIS and found that a former, leaking underground-storage tank with residual free product was present in the area. Recommendations to the Drinking Water Program included relocating the new well based on hydrogeological conditions and the geometry of the petroleum-contamination plume. Also, the required depth of well was increased to reach a better confined (protected) aquifer and the well design was modified to include additional casing and grout. The well permit also included the requirement that petroleum constituents be included as compliance-monitoring parameters.

Bureau of Water, 2600 Bull Street, Columbia, SC 2920 803-898-4300,
www.scdhec.gov/environment/water/srcewtr.htm


# South Dakota Source Water Protection Program

The South Dakota Department of Environment and Natural Resources coordinated the source water assessment effort for the state. The Department completed a source water assessment of each of the approximately 760 public water supply systems in South Dakota that were active at the time of the assessment. Source water protection is voluntary in South Dakota and protection activities conducted by public water systems are not required to be reported to the Department of Environment and Natural Resources.

**Active Water System Data (from the Federal Safe Drinking Water Information System as of 01/18/2013)**

| | CWS | NTWS | TWS | Ground | Surface |
|---|---|---|---|---|---|
| **Number of Systems** | **458** | **24** | **163** | **505** | **140** |
| **Population Served (1,000's)** | **742** | **9** | **24** | **343** | **432** |

**State Definition of Substantial Implementation of the Source Water Protection Program**
South Dakota defines substantial implementation as occurring when the State determines for each community water system that protection actions have been or are being taken to appropriately address state-identified significant sources of contamination. Examples of specific actions can include zoning and land use measures, state or local health regulations, land acquisition or conservation easements, public outreach or education, or other actions taken that will reduce the threat to the drinking water supply.

South Dakota defines a source water protection plan as a plan produced by a community water system that describes how it will prevent and/or manage disruptions to its drinking water supply due to events such as contamination, vandalism, terrorism, natural disasters, or overuse of the resource. The plan usually includes assessment information, planning and implementation teams, points of contact, management measures, and a contingency plan. Having a plan does not necessarily mean a community is implementing protection measures. Also, a community can substantially implement protection measures without having an actual source water plan.

**Number/Population of Community Water Systems Reported as Achieving Substantial Implementation**
The number of communities with substantial implementation of source water protection for FY2012 is 106 systems (23% of total) with an associated population of 441,409 (54% of total state population based on 2010 census).

**Case Example**
County ordinances remain the main avenue for specific wellhead/source water area requirements and restrictions. South Dakota DENR continues to actively work with the counties developing ordinances by providing technical assistance and supplying them with information such as SWAP data, model ordinances, and shallow aquifer maps. DENR has worked with the East Dakota Water Development District to protect drinking water in the eastern part of the state. A total of 10 counties within the EDWDD have implemented overlay districts and ordinances to protect drinking water. Go to: http://www.eastdakota.org/ . An additional five counties in eastern South Dakota outside the EDWDD have adopted wellhead/source water protection ordinances.

South Dakota DENR also cooperates extensively with the South Dakota Association of Rural Water Systems (SDARWS) regarding wellhead and source water protection efforts in South Dakota. The SDARWS works closely with numerous communities across the State to develop source water protection plans and promote protection activities.

Other State source water protection activities include:

- Local government or PWS land purchases in agricultural areas
- County ordinances
- Local regulation of septic systems
- CAFO programs not allowing manure application in areas of Zone A
- Not allowing groundwater discharge permits in wellhead/source water areas
- UST/AST program taking into account SWP areas for spill remediation, UST requirements for double walled tanks and piping near water systems, and AST systems under federal SPCC rules complying with secondary containment requirements
- New PWS well siting conducted to meet specific minimum distances from potential sources of contamination
- Prioritize EPA Class V inspections in SWP areas
- USDA using water quality sensitive areas around PWS wells for inclusion in CRP
- SDDOT using SWP information for locating waste disposal areas.
- Using SWP information to develop groundwater vulnerability mapping
- Trans-Canada routing existing and proposed crude oil pipelines around wellhead/source water Zone A protection areas

For more information, go to: http://denr.sd.gov/des/gw/Sourcewater/Source_Water_Protection.aspx
or contact:
Tom Brandner, Source Water Coordinator
Ground Water Quality Program
South Dakota Department of Environment and Natural Resources
Joe Foss Building
523 E Capitol Ave
Pierre, SD 57501
(605) 773-3296 or Tom.Brandner@state.sd.us.

# Division of Water Resources

**Introduction:**
The Tennessee Department of Environment and Conservation (TDEC), Division of Water Resources, Water Quality Branch, Drinking Water Unit (DWR-DWU) (formerly known as the Division of Water Supply) is the primacy agency for the Safe Drinking Water Act. The Ground Water Management Section (GWMS), which is part of DWR-DWU, is in charge of the development and implementation of Tennessee's Source Water Assessment Program (SWAP). The SWAP is an evaluation of the source water that provides drinking water to each public water supply system in Tennessee. This evaluation determines the degree to which a public water supply is protected, or is at risk, from contamination. Once completed, the assessment results are used to assist local communities in implementing protection measures such as contingency planning, implementation of best management practices, adoption of local ordinances, and public education.

**Water System Data (2012):**

| | CWS | NTNC | TNC | Ground | Surface |
|---|---|---|---|---|---|
| Number of Systems | 480 | 44 | 337 | 582 | 279 |
| Population Served | 6,223,229 | 25,796 | 53,522 | 1,635,697 | 4,666,850 |

**TN's Definition of Substantial Implementation of Source Water Protection:**
Tennessee's Source Water Protection activities include a regulatory approach coupled with a partnership of water systems, concerned citizens, local government, non-government organizations, state and federal agencies as a part of the ongoing effort to protect the drinking waters of Tennessee.

**Number/Population of CWS systems reported as achieving substantial implementation:**
259 systems (54%) with a population served of 2,092,858 (34%)

**Case Example:** Disinfection By-Products (DBP) and high Total Organic Content (TOC) are buzz words in the drinking water industry. The GWMS has looked at the data from all the drinking water systems using surface water in Tennessee and has compiled a list of drinking water systems and their source water protection areas based on the highest DBP and TOC numbers. The GWMS has contracted with the State's Division of Geology (DG), to conduct an on the ground survey of the top ten source water protection areas looking specifically for illegal discharges (straight pipes), failing septic systems, and illegal systems. The overarching plan is that if DG can locate these potential sources, then the drinking water systems through their normal data collection should be able to show a reduction in DBP and TOC.

Tennessee Division of Water Resources
Water Quality Branch, Drinking Water Program, 401 Church Street, L&C Tower, 6th Floor
Nashville, TN 37243, 615-532-0191
www.tn.gov/environment/dws/tnswa.shtml

## Texas Source Water Assessment and Protection Program

The Texas Commission on Environmental Quality (TCEQ) provided the results of the Source Water Susceptibility Assessments (SWSA) to each public water supply (PWS) by May 2003. These SWSAs represented years of research, analysis, and investigation by state officials, trade organizations, federal, state and local agencies, and water service providers. The assessments contain information specific to each PWS, its source waters, and areas of concern which may impact source waters.

The TCEQ administers the Source Water Protection (SWP) program, which allows each PWS to take an active role in maintaining drinking water quality. The Drinking Water Protection team provides SWP services at no charge. Because the SWP program is voluntary, participants have a wide degree of latitude in creating their programs. Most SWP participants have implemented their programs by working cooperatively with community members and via public education.

The Source Water Assessment Program (SWAP) program identifies which water sources are susceptible to chemical and biological constituents. Additionally, the SWAP program provides PWSs with the basic tools to prevent contamination from occurring in the first place. If the SWSA demonstrates that a PWS is not susceptible to a specific chemical, the TCEQ may issue a monitoring waiver, thereby saving the PWS money.

A PWS needing help in implementing a SWP program has a number of choices for assistance. The Drinking Water Protection (DWP) team assists systems that are implementing SWP programs. PWSs may either contract to private consultants or implement their own SWP program. A TCEQ SWP guidance document is also available. Funding for implementing a SWP program is available through the Drinking Water State Revolving Fund (DWSRF).

**Water System Data (Safe Drinking Water Information System 9/30/2012)**

| | CWS | NTCWS | TNCWS | Ground | Surface |
|---|---|---|---|---|---|
| Number of systems | 4,680 | 896 | 1,362 | 5,573 | 1,365 |
| Population Served (1000's) | 25,401 | 512 | 268 | 6,334 | 19,846 |

**State Definition of Substantial Implementation of the Source Water Protection Program**

* To review the Substantial Implementation definition, go to Appendix B.

**Number/Population of Community Water Systems reported as achieving Substantial Implementation (SDWIS 9/30/2012)**

1,607 systems (34%) with a population served of 14,183,423 (57%)

**Case Example -** The Texas SWP program is currently working with over 30 Public Water Systems to complete their SWP programs. This is accomplished through our contractor Atkins North America. Texas Rural Water Association who also provides SWP technical assistance through SWP workshops. Systems attend these workshops and learn valuable knowledge that enables them to complete a new project or update an existing SWP project. The TCEQ Drinking Water Protection Team assists water systems by providing maps, databases, best management practice recommendations and inventory technical assistance. We are currently working with our contractor to complete an online Source Water Protection Web Tool. This online tool will guide water systems through the SWP process and assist them in completing their SWP program.

For more information on Texas' Source Water Protection Program, see the links below.
http://www.tceq.texas.gov/drinkingwater/SWAP, http://swaptexas.org/success_stories.htm , http://swaptexas.org/
Texas Commission on Environmental Quality
Water Supply Division PDWS MC-155, P.O. Box 13087

Austin, TX 78711-3087
512-239-4691


## Utah Source Water Protection Program

Approximately 2,000 groundwater and surface water sources were assessed and zones were delineated by 2004, and now the plans are updated on a six-year cycle. Source Protection Plans and implementation of the plans are required by state law. The Division provides significant support to water systems, directly and through the Rural Water Association of Utah. The Division web site is a great resource for the public and those interested in source protection. Go to: http://www.drinkingwater.utah.gov/source_protection_intro.htm

**Utah Public Water System Data (from the Utah database system as of 1/22/2013)**

| | CWS | NTNC | TNC | Groundwater | Surface water |
|---|---|---|---|---|---|
| Number of Systems | 468 | 69 | 469 | 926 | 116 |
| Population (1,000s) | 2,806 | 29 | 80 | 878 | 2,039 |

**State Definition of Substantial Implementation of the Source Water Protection Program**

Utah considers a community system that has completed all source protection plans, and has completed at least one update cycle, to have substantively implemented their source protection program.
For groundwater sources, which include springs, a Drinking Water Source Protection (DWSP) Plan must be developed, including delineations, inventory of potential contamination sources (PCSs) and assessment of risk, a management program to control each pre-existing source (PCS), and a management program to control future potential contamination sources. The controls can include: regulatory controls, BMPs, or physical controls.

For surface water sources, protection zones are also delineated, potential contamination sources are inventoried, susceptibility is assessed, and a management strategy must be implemented for the top three highest-priority uncontrolled potential contamination sources. The plans are updated every six years and as necessary, PCSs are re-inventoried, reassessed for risk, reprioritized, and management plans are revised. Substantial implementation is in place when the DWSP Plan is current and complete, a management plan is in place to control or prohibit contaminant sources, and one update cycle has been completed. Completing the update cycle demonstrates that systems have actively used their Source Protection Plans as management tools to protect their drinking water sources.

**Number/Population of Community Water Systems Achieving Substantial Implementation as of 1/22/2013**

A total of 380 systems (81% of total) with a population served of 2,290,509 (82% of total) have achieved substantial implementation.

**Case Examples**

**Source Water Protection Requirement**
Utah is one of the only states in the U.S. to enact rules requiring source water protection. Starting in 1993, the Drinking Water Source Protection Rule (UAC R309-113, currently numbered as UAC R309-600) was established to require a uniform, statewide program to ensure protection of ground-water sources of drinking water. In 2000, Utah enacted UAC R309-605 “Drinking Water Source Protection for Surface Water Sources.” To see the rules, go to http://www.drinkingwater.utah.gov/rules.htm.

**Drinking Water Information Online**
Information about drinking water facilities and source protection zones is available through the DEQ Interactive Map. The Interactive Map is very useful for water systems as they update their inventory of contamination sources. In addition to drinking water information, the Interactive Map also includes underground storage tanks, CERCLA sites, and many other sites regulated by Utah DEQ.

**Land Management Strategies**
In Utah, cities and towns have extraterritorial jurisdiction to enact ordinances to protect a stream or "source" from which their water is taken "for 15 miles upstream and for a distance of 300 feet on each side of such stream." This also applies to ground-water sources. This authority is based on the Municipal Code 10-8-15, which can be reviewed here: http://le.utah.gov/~code/TITLE10/htm/10_08_001500.htm

Land management strategies include zoning and subdivision ordinances, site plan reviews, design and operating standards, source prohibitions, purchase of property and development rights, public education programs, ground water monitoring, etc. Some examples are available at this link:
http://www.drinkingwater.utah.gov/documents/spec_services/County_Ordinances.pdf

**Working with Federal Land Managers**
In Utah, over 70% of the land is Federal or State property. The DDW has worked with USFS and BLM to advance protection of drinking water sources. DDW has reached out to educate other federal and state agencies about protection of drinking water. Drinking Water Source Protection Zones are provided as GIS layers to Federal agencies and other land managers upon request. Federal agencies have used the DWSP GIS layers to protect drinking water sources when making land use decisions. For example, see Utah BLM's Instruction Memorandum on "Protection of Ground Water Associated with Oil and Gas Leasing, Exploration and Development." Drinking Water Source Protection Zones are offered special protection.
http://www.blm.gov/ut/st/en/prog/energy/oil_and_gas/ground_water_protection.html

For more information related to Utah's Source Protection Program, see the link below.
http://www.drinkingwater.utah.gov/source_protection_intro.htm

Or contact:
Kate Johnson
Utah Division of Environmental Quality
Division of Drinking Water
195 North, 1950West
Salt Lake City, UT 84114
Phone: (801) 536-4206
Email: katej@utah.gov

## Vermont Source Water Protection Program

The State of Vermont requires a Source Protection Plan for every Community and NTNC water system with its own source. This plan is required to be updated every three years and is required in order to obtain Phase II/IV monitoring waivers. Systems must update their plans to maintain compliance with State regulations. The plan must contain active protection measures the water system will implement for the management of potential sources of contamination identified within its source protection area. The water system is required to maintain a current list of landowners and potential sources of contamination within its source protection area and educate them about source protection.

The State reviews and assesses the systems' protection activities, as well as future planned protection activities. The State also provides assistance and training to systems to develop and implement source protection, including talking to local organizations, committees, and officials about source protection. A financial assistance program for purchase of land in source protection areas is available. Since 1984, Vermont has provided an excellent resource for groundwater systems entitled *An Ounce of Prevention, A Groundwater Protection Handbook for Local Officials*. The most recent version of the publication, last updated in 2005, is available on-line at http://drinkingwater.vt.gov/pcwssourcewaterprotection.htm

Reporting

Due to its state requirements, Vermont considers 100% (429) of the community water systems in the state as substantially implementing source water protection. These systems serve 100% of the community water system population (441,267 people).

| **Public Water System Data as of December 31, 2012** | **CWS Protected** | **Total No. of CWS** |
|---|---|---|
| Number of Systems Protected | 429 | 429 |
| Population Served | 441,267 | 441,267 |

Successful Stories - St. Albans Water Department & Brandon Fire District #1

Many systems in Vermont are actively protecting their water supplies, such as the City of St. Albans Water Department which has purchased a total of 850 acres around its reservoirs. Recently, St. Albans purchased an additional 100 acres around one of their primary reservoirs through the VT Drinking Water SRF land acquisition program.

The City of St. Albans, Vermont has implemented a multi-faceted source water protection program as a result of numerous potential contaminants identified at their surface water sources, Lake Champlain and Fairfax reservoir. With assistance from the Vermont Rural Water Association, the system operators continue to educate Lake Champlain SPA residents on shoreline stabilization and septic maintenance. The replacement of an undersized culvert that was causing sediment to erode and accumulate in the Fairfax Reservoir was funded by the Vermont Better Backroads Program with labor provided by the Town of Fairfax. Thousands of migratory geese have been prevented from landing near intakes with assistance from the USDA Animal and Plant Health Inspection Service (APHIS) Wildlife Services program. Fairfax Reservoir watershed landowners are encouraged to use proper techniques to prevent erosion during maple sugaring season and limit use of ATVs and snowmobiles. The St. Albans Water Department has worked to provide funding for farmers to take measures to reduce runoff on fields near water supply intakes with assistance from the Vermont Agency of Agriculture and USDA Farm Service Agency. Additionally, through the basin

planning process, the system has sought to add stormwater controls such as modified rain gardens and grass waterways to slow runoff and potentially increase the uptake of nutrients.

Brandon, VT Community Water System Receives Class II Groundwater Designation

Brandon Fire District #1 submitted the state's first petition for a Class II Groundwater reclassification for consideration to the Vermont Agency of Natural Resources (ANR). In December 2011, this Vermont community water system received the Class II Groundwater designation. Class II groundwater applies to groundwater that has been determined by the ANR Secretary to have uniformly excellent character; exposure to activities which may pose a risk to it use as a public water supply; and is in use, or is determined to have a high probability for use, as a public water supply source. After pursuing this reclassification for many years as an existing public community water supply, the Fire District now can provide an enhanced degree of groundwater protection to municipal system customers. Assistance from the Vermont Rural Water Association was essential in the petition process, including land use assessment, hydrogeological mapping, and development of the petition's text and maps. It is Brandon Fire District #1's further goal that Brandon can serve as an example in motivating other municipalities to establish Class II Groundwater areas for their existing public community water supplies and for groundwater areas that have a high probability for use as a public water supply, but are not yet developed.

**For more information, contact:**

State Source Water Program Contact:
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Vermont Dept. of Environmental Conservation
Drinking Water and Groundwater Protection Division
1 National Life Drive, Main 2, Montpelier, VT 05620-3521
(802) 585-4912
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# Virginia Source Water Protection Program

The Virginia Department of Health (VDH), as the Commonwealth's agency regulating public drinking water, was required by the 1996 Amendments to the Safe Drinking Water Act (SDWA) to develop a Source Water Assessment Program (SWAP). The goal of the SWAP was to establish procedures and provide a foundation of support for protecting the Commonwealth's drinking water resources from degradation. This degradation can be the result of residential, industrial, commercial, agricultural, waste management, or transportation's: accidental introduction of contaminants; improper land use practices; illegal material handling practices; and other conditions. These conditions and practices can threaten the drinking water resources of the Commonwealth.

On May 26, 2005, EPA granted final approval to Virginia's Source Water Protection Program. Protection of ground water source public water systems will be achieved through: ongoing regulatory and non-regulatory state programs; voluntary participation by local governments in land use management; and development of local planning and zoning ordinance that accounts for these issues.

**FY2010 Water System Data (from the Federal Safe Drinking Water Information System)**

| | CWS | NTCWS | TNCWS | Ground | Surface |
|---|---|---|---|---|---|
| Number of systems | 1,215 | 592 | 1,147 | 2,549 | 400 |
| Population Served (1000's) | 6,615 | 300 | 164 | 753 | 6,326 |

**State Definition of Substantial Implementation of the Source Water Protection Program**

A Waterworks has developed a written strategy which is being followed. The strategy does not have to be approved or certified by state but should include all elements of source water strategy such as:

a. management team or advisory group that meets on a regular basis,
b. identified potential contaminate source(s) [results of SWAPs],
**c.** recommended action(s), and contingency planning.

Wells in confined aquifers east of the fall zone of Virginia are also considered substantial implemented if a strategy for source water protection is in place.

**Number/Population of Community Water Systems reported as achieving Substantial Implementation:**

**185** systems (16%) with a population served of 3,249,699 (48%)

**Case Example – Wellhead Protection**

Source Water Protection Programs are voluntary in the Commonwealth of Virginia. The Office of Drinking Water encourages and financially supports community's efforts to develop source water protection plans. These programs provide technical support to assist small water systems serving less than 10,000 people. Participation in this program has enabled several small water systems to prepare and implement site-specific Source Water Protection Plans, while a number of other waterworks are currently in the process of completing their plans.

For more information about the Commonwealth of Virginia's SWAP, please contact the Virginia Department of Health at 804-864-7500 or go to this website: http://www.vdh.state.va.us/ODW/SourceWaterProtection.htm


# Washington State Source Water Protection Program

The Washington State Source Water Protection Program provides information, tools, resources, guidance and support to water systems and others to promote and achieve source water protection statewide. The ultimate goal is to ensure safe and reliable drinking water for the people of Washington State.
Program priorities include:

- A mandatory Group A water system planning process that includes source water protection planning.
- Providing technical assistance and grant funding (using Source Water Protection DWSRF set-asides) to high priority water systems to help them achieve and maintain substantial implementation.
- Developing and maintaining a publicly-accessible GIS mapping database that includes source water protection areas, potential contaminant sources, water system service area boundaries, and other key information.
- Establishing interagency partnerships with key federal, state, and local agencies to ensure that their programs, messages, and decisions incorporate source water protection as appropriate.
- Continuous state program improvement through strategic program planning and developing/tracking measures for success

All Group A public water systems are required by state law (WAC 246-290) to develop a Source Water Protection Program as part of their required water system planning process. In addition, all Group A public water systems have participated in the statewide Source Water Assessment Program by delineating their source water protection areas, developing an inventory of potential contaminant sources, completing source susceptibility assessments, and notifying key agencies. This constitutes "initial implementation" of our state source water protection program. Results of the Source Water Assessment are housed in our publicly-accessible GIS mapping database. We also require all new sources to meet state source water protection requirements through our regulated source approval process (WAC 246-290).

**Water system Data (from the Federal Safe Drinking Water Information System as of 9/30/2011):**

| | CWS | NTNC | TNC | Ground | Surface |
|---|---|---|---|---|---|
| Number of systems | 2,242 | 318 | 1,556 | 4081 | 270 |
| Population Served | 6,418,929 | 148,860 | 387,634 | 3,170,378 | 3,785.045 |

**State Definition of Substantial Implementation of the Source Water Protection Program:**

1. Water systems within a municipality or county where the local government develops and implements a water resource protection program, including local ordinances, which explicitly recognizes source areas of public drinking water systems (wellhead protection areas, surface water watersheds) under either the state's Critical Aquifer Recharge Area* as part of the state's Growth Management Act (CARA/GMA) or its watershed protection planning process, or;
2. If most or all of the potential sources of contamination identified in an assessment are being addressed by a regulatory program and there is acknowledgement by the lead regulatory agency that they will use this source inventory to help target compliance and technical assistance efforts.

**Number/Population of Community Water systems reported as achieving Substantial Implementation:**

1,270 systems (55%) with a population served of 5,634,930 (88%)
**Case Examples:**

*Technical Assistance* – In 2007, we coordinated source water protection technical and financial assistance to the City of McCleary to evaluate threats to its shallow aquifer, Wildcat Creek. We helped McCleary develop a workgroup including Evergreen Rural Water of Washington, Grays Harbor County, private consultants, citizens, and our own staff. We also provided funding through the DWSRF SWP set-asides to enable the city to hire a consultant, conduct the study, and implement recommendations. As a result of this work, Grays Harbor County adopted a critical aquifer recharge area ordinance. We continue to provide similar source water protection assistance around the state, including Town of Carbonado, City of Ilwaco, City of Spokane, City of Port Townsend, City of Walla Walla, Clark County, City of Quincy, Island County, and many other areas.

*Funding* – We use some of the Drinking Water State Revolving Fund set-asides to fund a source water protection grant program. We provide up to $30,000 in grant funding for high priority source water protection projects that help prevent or resolve water quantity and water quality problems. Through this grant program we have funded several regional hydrogeologic studies; a watershed protection evaluation for the Town of Carbonado; and a feasibility study for Freeman School District to determine best options for addressing carbon tetrachloride contamination of the aquifer. We also provide grants to local governments to update their GIS service area boundary information. This information supports source water protection activities such as improved emergency preparedness and response.

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## West Virginia Source Water Assessment and Wellhead Protection Programs

The West Virginia Department of Health and Human Resources, as the primacy agency regulating public drinking water developed the Source Water Assessment and Protection Program that encompasses both the wellhead protection and surface water source water assessment efforts. The 1986 and 1996 amendments to the Safe Drinking Water Act respectively created the Wellhead Protection and Source Water Assessment Programs. Implementation of the wellhead protection program began in the early 1990's, as part of West Virginia ground water protection strategy. This protection strategy was extended to surface water sources with the 1996 Safe Drinking Water Act Amendments. The Act requires states to develop and implement a Source Water Assessment and Protection (SWAP) program designed to evaluate the vulnerability of public drinking water systems to possible sources of contamination, and encourages states to work with these systems in developing protection, management plans and public education. West Virginia's past and future success can be attributed to the cooperative working relationships shared between the West Virginia Department of Environmental Protection, West Virginia Department of Agriculture, West Virginia Rural Water Association, and many other stakeholders.

**FY2012 Water System Data (from the Federal Safe Drinking Water Information System):**

| | CWS | NTCWS | TNCWS | Ground | Surface |
|---|---|---|---|---|---|
| Number of systems | 487 | 118 | 419 | 695 | 329 |
| Population Served (1000's) | 1,507 | 36 | 31 | 303 | 1,270 |

**State Definition of Substantial Implementation of the Source Water Protection Program:**
Substantially implemented – Any community public water supply system or a group of systems that has a protection plan in place and is addressing at least three of the top protection measures identified in its state supplied source water protection plan and/or locally defined protective measures approved by the state is considered substantial implemented. For systems serving 3,000 or fewer people, substantial implementation will be determined on a system by system basis.

**Number/Population of Community Water Systems reported as achieving Substantial Implementation:**
348 systems (69%) with a population served of 1,407,225 (93%)

**Case Examples:**

Technical Assistance - The West Virginia SWAP team continues to assist water systems by providing maps, databases, best management practice recommendations and inventory technical assistance. Team continues to review proposed new drinking water sources to ensure they will not have a high susceptibility to significant potential contaminant sources. West Virginia contracted with two consulting engineering firms to provide technical expertise and assistance to over 164 interested community water systems for the development of their SWAP programs. The end result of this assistance was to provide an "approvable" local SWAP plan that meets the West Virginia requirements for approval. West Virginia Rural Water Association also continues to provide SWAP technical assistance.

Partnerships - SWAP program continues to participate in several regional SWAP projects such as the Potomac River Basin Drinking Water Source Protection Partnership facilitated through the Interstate Commission on the Potomac River Basin, website located at http://www.potomacdwspp.org/ and the Ohio River Drinking Water Source Protection work group facilitated through the Ohio River Valley Water Sanitation Commission.

Funding - West Virginia made funding grants available to community public water systems through the Drinking Water State Revolving Fund. Eligible SWAP projects include source water protection measures and activities in existing source water protection areas and the associated communities. Projects are expected to provide benefits to drinking water quality, quantity, education, and/or security.

Assessing Information – SWAP program has developed and maintains a password protected web-based geographic information systems (GIS) tool for internal agency(s) and public accessibility to map public water supply wells, their Source Water Protection Areas and other key information. The program uses GIS for preparing and updating maps. The website can be accessed at http://157.182.212.211/DHHR/Default.aspx. Also, the community source water susceptibility assessment reports have been placed on the website to provide wellhead and source water areas, potential contaminant sources and susceptibility analysis for use by other utilities, state emergency management and federal agencies. Access to the reports is available at http://www.wvdhhr.org/oehs/eed/swap/search.cfm.

For more information about the West Virginia SWAP please contact the West Virginia Bureau for Public Health by calling 304-356-4298, or writing to:

Bureau for Public Health
Office of Environmental Health Services
Environmental Engineering Division
350 Capitol Street, Room 313
Charleston, WV 25301-3713
http://www.wvdhhr.org/oehs/eed/swap/

## Wisconsin Source Water Protection

In Wisconsin, 70% of residents and 97% of communities rely on groundwater ~~as~~ for their drinking water source, while most of the remaining residents get water either from the Great Lakes or Lake Winnebago. Source water protection in Wisconsin is voluntary for all systems except ~~for~~ new community water system wells constructed after May 1, 1992. Wisconsin Department of Natural Resources (WDNR) manages the program and uses publications, site visits, and distribution of tools like newsletters and wellhead ordinances to promote protection, with assistance from the Wisconsin Rural Water Association. In 2006, the WDNR and the Wisconsin Department of Agriculture, Trade and Consumer Protection reported that nitrate-nitrogen ($NO_3$-N) is the most widespread groundwater contaminant in Wisconsin, and that the nitrate problem is increasing both in extent and severity. In Wisconsin's groundwater, 80% of nitrate inputs originate from manure spreading, agricultural fertilizers, and legume cropping systems. On-site wastewater systems (septic systems) can also be a significant nitrate source in densely populated areas where fractured bedrock is near the surface, or areas with coarse-textured soils. Concentrations of nitrate-nitrogen in private water supplies frequently exceed the drinking water limit of 10 mg/L. In 2005, the WDNR combined data from three statewide groundwater databases and found that 11.6% of 48,818 private wells exceeded the nitrate limit.

**June 2012 Water System Data**

| | CWS | NTNCWS | TNCWS | Ground | Surface |
|---|---|---|---|---|---|
| **Number of Systems** | 1,055 | 864 | 9,513 | 11,376 | 56 |
| **Population Served** | 4,033,565 | 206,203 | 717,200 | 3,091,348 | 1,865,620 |

**State Definition of Substantial Implementation (SI) of the Source Water Protection Program**

A CWS has a wellhead protection plan in place for all of the wells in the system on or before September 1, 2006 and has completed appropriate source water protection actions to protect its water supply.

**FY 2012 Number/Population of Community Water Systems achieving Substantial Implementation**
153 systems (14.5%) with a population served of 595,015 (14.8%)

**Case Example: Town of Empire, Wisconsin Critical Areas Overlay District**
The Town of Empire in Fond du Lac County has developed a Critical Areas Overlay District that minimizes development in areas prone to unwanted soil erosion and groundwater contamination, and on sites difficult to develop in a safe manner. It also preserves unique and valuable geologic and other natural resource features such as the Niagara Escarpment and woodland. The ordinance specifies a ridgeline buffer, lists prohibited uses, states grading restrictions for roads, requires vegetative screening of buildings on the ridge, preserves existing vegetation and significant rock outcroppings and limits impervious surface.

Contact information: Internet: http://dnr.wi.gov/topic/DrinkingWater/SourceWaterProtection.html
Mail: Bureau of Drinking Water and Ground Water, P.O. Box 7921, Madison, WI 53703
Phone: (608) 266-2104 ~ Fax: (608) 267-7650

# Wyoming Source Water Assessment and Protection Program

Wyoming is the only state that has chosen not to take primacy of the State Drinking Water Program. EPA implements Drinking Water regulations in Wyoming. The Wyoming DEQ completed initial assessments for 385 public water systems in August, 2004. Some systems chose to not complete an assessment. All completed assessment reports and data layers are posted at: http://deq.state.wy.us/wqd/www/SWP%20WHP/

The second phase of the program, the Source Water Protection Phase, involves encouraging the public water systems to develop and implement a protection program to safeguard their water supplies. The Source Water Protection Phase is voluntary for each system and the Wyoming DEQ does not track completion or implementation of Source Water Protection Plans. There are also no State-approved Well-Head Protection Plans in Wyoming.

Wyoming DEQ has completed groundwater vulnerability mapping and some communities have used these maps for local decision-making. Wyoming DEQ has a strong groundwater protection focus within the Water Quality Division. For more information go to: http://deq.state.wy.us/wqd/groundwater/index.as

**Wyoming Rural Water**

The Wyoming Association of Rural Water Systems (WARWS or Wyoming Rural Water) has conducted Source Water Protection Planning and Groundwater/Wellhead Protection Planning programs since 1994. WARWS works closely with EPA Region 8 Rule managers and with WDEQ personnel in water quality.

Plans developed by Wyoming Rural Water are not made available publicly. All information must be obtained from the water system/planning committee that owns the protection plan. For more information go to: www.warws.com

**Water System Data (September 30, 2011)**

| | CWS | NTNCWS | TNCWS | Ground | Surface |
|---|---|---|---|---|---|
| Number of systems | 313 | 90 | 392 | 653 | 142 |
| Population served (1000's) | 450 | 23 | 75 | 198 | 349 |

**State Definition of Substantial Implementation of the Source Water Protection Program**

The State of Wyoming recognizes "any significant proactive actions taken by the PWS that specifically address the protection and/or preservation of their existing and future water supplies from contamination" as substantial implementation of a protection plan.

In Wyoming, there are no requirements, rules or regulations that impose the development or implementation of Source Water Protection (SWP) or Wellhead Protection (WHP) Plans on any PWS, either publicly or privately owned. However, communities and their PWSs have weighed the benefits of developing and implementing SWP or WHP plans and proceeded accordingly. Wyoming Rural Water defines substantial implementation as the point when the Source Water Protection Plan has been accepted by the planning team and it is in effect on the date when the first source water protection management activity occurs.

**Number/Population of Community Water Systems Reported as Achieving Substantial Implementation**
The State does not track implementation and it is not reported by Wyoming DEQ. Since 1994, WARWS has assisted in completing approximately 200 Source Water Protection and Groundwater/Wellhead Protection Plans.

**Case example**
**Wind River Canyon, Wyoming**. The Wind River runs through one of the most picturesque canyons in the world, and provides surface water sources to a number of communities along its path. In 2010 at the height of the spring runoff, the river was running in excess of 7,000 CFS (normally 2,400 CFS). A train derailment occurred at the mouth of the canyon only five miles upriver from the river intake of the Town of Thermopolis, Wyoming. Thermopolis is home to the world's largest natural mineral hot springs, and has hundreds of thousands of visitors annually. The Town has a population of approximately 2,000 – 3,000. At the time of the accident, WARWS's staff was onsite assisting the South Thermopolis Water and Sewer District (a consecutive system to the Town of Thermopolis), in updating its emergency response plan. The Town of Thermopolis has a SWP Plan in place. The value of having a SWP Plan in place, and working with consecutive systems to update their plans during this emergency, became apparent. The Town's operators were able to shut down the intakes before contaminants reached them and were able to provide invaluable information to the emergency team dispatched from
Burlington Northern Railroad and the National Transportation Safety Board.

For more information, contact:

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